



# CITY OF TAMPA

Pam Iorio, Mayor

CONTRACT ADMINISTRATION DEPARTMENT

David L. Vaughn, AIA, Director

## ADDENDUM NO. 2

**DATE: April 15, 2010**

Contract 10-C-00033; ARRA CDBG-R Green Building Upgrades to Community Facilities – HVAC Upgrades at Various Community Center

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

Item 1: Site visits - Recreation facilities will be open for bidders to examine existing conditions at the various locations. The time to visit sites will be between 2pm and 4pm on April 19th and April 20th only. Contractors shall be dressed appropriately and clearly identify themselves with the site manager when present. All site visits will be conducted by the Contractor's representatives.

Bidders wishing to access the roof at the Wayne C. Papy Center shall provide their own access from the exterior only. Bidders must clearly identify themselves with site managers and specifically inform the managers of their intentions of accessing the roof, and identify the specific areas they intend to inspect.

Item 2: Add to Instructions to Bidders subsection I-1.15, after section 1605, the attached EERE documents entitled EERE Nationwide Public Interest Waiver and the EERE Buy American Supply Item Clarification.

Item 3: Replace Section 15190 with the attached Section 15190.

Item 4: Add Section 15995 to the Specifications.

This addendum shall be included in and attached to the inside cover of the Contract Documents by and upon which bids are submitted.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect. Questions are to be e-mailed to Contract Administration@tampagov.net.

*Jim Greiner*

Jim Greiner, P.E., Contract Manager

## SECTION 15190 - MECHANICAL IDENTIFICATION

### PART 1 - GENERAL

#### RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions, apply to work of this Section.

#### DESCRIPTION OF WORK:

Extent of mechanical identification work required by this Section is indicated on drawings and/or specified in other Division 15 sections. Types of identification devices specified in this Section include painted identification materials, plastic pipe markers, valve tags, valve schedule frames, and plastic equipment markers.

Refer to Division 16 sections for identification requirements of electrical work; not work of this Section.

Painting specifications and color coding for pipes and equipment are also included in this Section.

#### QUALITY ASSURANCE:

Manufacturer's Qualifications: Firms regularly engaged in the manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than five years.

Comply with ANSI A13.1 for lettering sizes, enamel paint and plastic tape colors, and pressure sensitive vinyl pipe markers.

#### SUBMITTALS:

Product Data: Submit manufacturer's technical product data and installation instructions for each identification material and device required.

### PART 2 - PRODUCTS

#### ACCEPTABLE MANUFACTURERS:

Manufacturers offering mechanical identification materials which may be incorporated in the work include Allen Systems, Inc., Brady (W.H.) Co. (Signmark Div.), Industrial Safety Supply Co., Inc., and Seton Name Plate Corp.

#### MECHANICAL IDENTIFICATION MATERIALS:

Provide manufacturer's standard products of categories and types required for each application as referenced in other Division 15 sections. Provide single selection for each product category.

#### LETTERING AND GRAPHICS:

Designations used in mechanical identification work should correspond with those shown on plans. If not otherwise indicated, provide designations which allow proper identification and operation/maintenance of mechanical systems and equipment.

#### MECHANICAL SYSTEM IDENTIFICATION:

Provide a system of identification of all equipment, including dampers, and other appurtenances, to permit recognition of all components.

Piping System: Mark piping which is exposed, including concealed piping in accessible spaces i.e. lay-in ceilings, etc. Provide either pre-printed, color-coded plastic, self-sticking pipe markers; or color-coded stencil painted markers. Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specified.

Piping exposed in mechanical rooms and exterior to the building shall be painted using paint as specified and in accordance with the following Color Code Schedule.

Comply with ANSI A13.1 for colors as follows:

Color Code Schedule:

<u>Description</u>	<u>Color</u>	<u>Label</u>
Support Steel, etc.	Light gray	
Housekeeping Pads & Floors	Battleship grey (mechanical room)	
Chilled Water	Safety Blue	Chilled Water Supply
	Light Safety Blue	Chilled Water Return
Heating Hot Water	Safety Orange	Heating Hot Water Supply,
	Light Safety Orange	Heating Hot Water Return

Include arrows for direction of flow and content labels at twenty-foot maximum intervals. Locate markers at terminations of lines and near major branches; near control valves and at equipment connections; at wall, floor and ceiling penetrations; and at access doors where piping is in concealed spaces. Coat each pipe marker with at least one coating of water-resistant spray such as "Splac".

Valves:

All main and branch shut-off valves shall be tagged with a 2" diameter brass or laminated "Bakelite" plastic numbered disc, color code for each piping service. Exclude check valves, hose bibbs, faucets and shut-off valves for plumbing fixtures. Discs shall be stamped or engraved with letters at least 1/4" high. Securely attach discs with brass chains, nylon ties, or center hole mount on valve stem or handle. Provide typewritten chart with valve numbers, location and use. Mount in aluminum metal frame with plastic window for 8-1/2" by 11" chart format and mount on Mechanical Room wall where indicated. Provide duplicate copies of valve charts and include them in Maintenance and Operation Manuals.

Duct System:

Provide stencil-painted identification on ductwork, with lettering size sufficient for reading but not less than 3/4-inch and including arrows to show direction of flow. Indicate flow direction at fan housings, remote coils, fire and smoke dampers, control dampers, dehumidifiers and VAV boxes. On access doors, indicate service and equipment being accessed. Where ducts are concealed behind access doors or removable ceilings, identification may be by plasticized tags in lieu of stencil-painted markers.

Manual Volume Dampers: Spray paint a continuous minimum 6" wide fluorescent orange band around entire perimeter of the outside surface of the duct or when externally insulated, on the surface of the duct insulation, at all locations where manual volume air dampers are installed.

Equipment:

Provide tag identification with the equipment unit tag as indicated on the drawings for every piece of equipment. Tag identification shall be laminated phenolic plastic, chamfer edges, black front with white core, with lettering etched through the outer covering. White engraved 1/4" letters on black background.

Operational Tags:

Where needed for proper and adequate information on operation and maintenance of mechanical equipment, provide tags of plasticized cardstock, pre-printed to convey messages such as: "DO NOT CLOSE THIS VALVE EXCEPT WHEN BURNER IS OFF".

Nameplates:

Each unit of equipment shall be identified by a permanently factory attached nameplate bearing information pertaining specifically to the unit installed.

Dampers:

At each access door, provide a label with letters at least 1/2" high stating the damper number and purpose. Identify the dampers with red letters on a white background. Identify all other dampers with black letters on a white background.

Miscellaneous:

All switches, starters, pilot lights, remote gauges and control panels shall have attached or mounted adjacent thereto a black surface, white core Bakelite nameplate indicating which equipment it controls. Nomenclature shall be in accordance with a schedule submitted to and approved by the Owner.

Ceiling Tags:

Provide a 1/2" x 3" laminated phenolic coated plastic nameplate, black letters on white background for each VAV box, power ventilator, motorized damper, AHU or other equipment located in the ceiling space. If the equipment is located above a hard ceiling, locate nameplate on access door. If located above a ceiling, tile ceiling, locate on the T-bar next to the access tile.

PART 3 – EXECUTION

GENERAL INSTALLATION REQUIREMENTS:

Install identification after completion of surfacing covering and painting. Indicate direction or flow with arrows at 10'- 0 maximum intervals.

EQUIPMENT IDENTIFICATION:

Paint the equipment identification abbreviation as shown on the plans for all major pieces of mechanical equipment.

ADJUSTING AND CLEANING:

Adjusting: Relocate any mechanical identification device which has become visually blocked.

Cleaning: Clean face of identification devices.

PAINTING:

No paint containing lead will be allowed.

All paint materials and equipment used on the job shall be stored in a single space designated by the owner. The storage area shall be kept neat and clean. Floors shall be adequately protected from paint spillage. All cloths and cotton waste which might constitute a fire hazard shall be placed in metal containers and destroyed at the end of each work day. All damage caused to surfaces within the storage area shall be repaired. A fire extinguisher shall be provided and fully charged at all times for this area.

Provide primers and other undercoat paint produced by same manufacturer as finish coats. Primers shall be compatible with finish paints.

All work shall be guaranteed by this contractor against defects caused by use of inferior materials or workmanship for a period of 1 year from date of final acceptance of building.

All hangers and pipe support floor stands shall be painted. The system shall be painted up to but not including the flanges attached to the mechanical equipment nor the flexible conduit connected to electrical motors. Colors shall be as noted in the Color Code Schedule.

All systems which are an integral part of the equipment, that is originated from the equipment and returning to the same piece of equipment, shall be painted between and up to but not including the fixed flanges or connections on the equipment.

All metal surfaces to be painted shall be thoroughly cleaned of objectionable matter before priming or field coat are applied. Wire brushes shall not be used on galvanized and shop painted surfaces.

Unpainted Ferrous Metal: Surfaces shall be cleaned with wire brushes or by other proper and acceptable means. Grease and oil shall be removed with benzene, or other similar volatile cleaners. The surface shall be free from moisture.

Zinc-Coated (Galvanized) Surfaces: Grease and oil shall be removed with benzene, or other similar

volatile cleaner. Surfaces shall then be treated with an approved chemical compound such as phosphoric acid wash. The chemical compound shall be completely removed with clean, fresh water, and the surfaces thoroughly dried prior to priming.

Zinc-Chromate Shop Painted Ferrous Metal: Grease and oil shall be removed with benzene, or other similar volatile cleaner.

Structural and miscellaneous metals are specified to be shipped to the job site with prime coat. Items shall be touched-up as necessary at the job site prior to erection.

Ferrous materials delivered to the job site without shop coats shall be thoroughly cleaned and primed in the field. Cleaning shall be in accordance with Steel Structures Painting Council Surface Preparations Specifications #2. After cleaning, all surfaces except galvanized shall be primed with zinc-chromate iron oxide primer, equal to Pittsburgh's formulation 17-6. Galvanized surfaces shall be prepared as previously specified and given a special galvanized primer.

After erection, all weld splatter shall be removed and additional cleaning done, as required, to ensure a proper paint bond. The prime shall be applied to all surfaces as soon as possible after cleaning.

Pipe and equipment insulation such as canvas jacket insulation to be painted shall be cleaned of all loose foreign and objectionable material prior to priming.

Wherever previously primed or painted surfaces have been destroyed or defaced, they shall be restored with materials of like kind. Gouges or scratches in factory-applied finishes shall be filled with suitable fillers and sanded smooth prior to priming and painting or for special finishes, refinished in accordance with manufacturer's recommendations.

The premises shall at all times be kept free from accumulation of waste material and rubbish by employees or work. At the completion of the painting remove all tools, scaffolding, surplus materials, and all rubbish from and about the buildings and leave work area "broom clean" unless more exactly specified.

Upon completion, remove all paint where it has been spilled, splashed, or splattered on floors, fixtures, equipment, furniture, and all other surfaces, leaving the work ready for inspection.

EXTRA STOCK:

Furnish minimum of five percent extra stock of each mechanical identification material required, including additional numbered valve tags for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.

This contractor shall furnish the owner with one full gallon can of each finished color and complete manufacturer label and formula, and color chip with manufacturer's color name and/or code and location at which paint occurs.

END OF SECTION 15190

SECTION 15995 – SYSTEM STARTING/COMMISSIONING

PART 1 - GENERAL

RELATED DOCUMENTS:

Requirements of Section 15010 – “Basic Mechanical Requirements” govern the work specified in this section.

DESCRIPTION OF WORK:

The work described under this section is to be performed by this mechanical contractor and includes all labor, materials, equipment and services necessary to bring the complete mechanical system to a state of static completion, as shown on the drawings and as specified, and ready for testing and balancing.

The Engineer of Record (EOR) is responsible for review of prepared reports, graphics, and checklists, and shall perform cursory review of installation to ensure compliance with requirements herein. The EOR shall provide written conformation to the owner that all items and requirements included in this section have been completed.

The EOR shall provide review of the Test & Balance report and shall make recommendation to the owner that the system is ready for final review and acceptance.

QUALITY ASSURANCE:

All work shall be done in a workmanlike manner in accordance with good practice, manufacturer's recommendations and in compliance with the Florida Mechanical Code and Owner Requirements.

REPORTS:

Furnish completed checklist of commissioning procedures, Start-Up Data Sheets and inspections as required in this section.

PART 2 – PRODUCTS

CHECKLISTS:

Provide the attached checklists and Start-Up Data Sheets for the coordination of system commissioning and start-up.

GRAPHICS:

Provide non-fading diagrams, schematics, schedules and sequences enclosed within an extruded aluminum frame with 1/8” clear acrylic sheet glazing over the printed material. Provide with acid-free foam core backing board. The framed schematics and sequences described above, shall be mounted on the wall inside the mechanical room.

PART 3 - EXECUTION

COMMISSIONING:

General: Perform the following tasks to insure that all work is completed and ready for test and balance. Indicate performance of each task by checking off appropriate item on Checklist provided in Part 2.

Start-Up Sequence shall be as follows:

Air handling units, shall be started with proper filtration and servicing as indicated in these Specifications. Outside air intakes shall be closed.

Verify proper dehumidification operation of the units, i.e., condensate flow, air flow, and coil temperatures. Ensure chilled water temperature and flow is current for chilled water coil. Open

outside air intakes to proper position once these items are verified.

Procedures:

**Start-Up:** Use Start-Up Checklist shown in Part 2 to verify start-up procedures specified in other sections. If required, certify by affidavit that start-up procedures have been performed and that equipment installation is in accordance with the manufacturer's written installation recommendations.

**Air Distribution Check:** Visually check all air distribution equipment to see that it is installed and "roughly" adjusted per specification.

**Filter Check:** Visually check filter installation. For panel filters, check adjustment of latching devices, installation of end spacers in filter boxes, and proper latching and sealing of access doors. For roll filters, check installation of media in curtain guides and over tensioning devices for interlocking of controls with fan operation, and check setting of pressures and time controls.

**Air Vent Check:** Check air vents at high points of systems and determine if all are installed and operating freely (automatic type) or to bleed air completely (manual type).

**Lubrication:** Provide a lubrication schedule, listing the points to be lubricated for each piece of equipment requiring lubrication. List the product and the application device to be used and the frequency of lubrication required. Provide initial lubrication of the equipment before start-up, along with flushing of anti-rust compounds that may have been furnished by the manufacturer.

Remove and clean all strainers.

**Instrumentation:** Provide a checklist of the installation of the air filter gauges, water pressure gauge cocks, gauge connection points, gauge manifolds on pumps, thermometers, thermometer wells, pilot traverse stations, and flow measuring devices. Include verification of the following:

Check physical locations of input points for reading, to ensure that the device is measuring what it was intended to measure.

Verify appropriate types of devices, such as a thermometer well for a bimetal stem, versus a test stem for a glass stem thermometer.

Confirm the scale range, such as a compound gauge at condenser water pump suction, so as to place the normal reading near the middle of the scale.

Ensure positioning of instrumentation to allow reading from a convenient location, for reading pairs of instruments from one location, and for easy access.

Calibration of instruments, such as air filter gauges.

**Hydronic System Heat Transfer Fluids:**

The work of degreasing the piping systems, pretreatment of water in closed circulation systems, and charging of anti-freeze solutions or other heat transfer fluids is specified in other sections.

After initial cleaning, flush the system using temporary strainers of fine mesh to remove the remaining particulate above the strainer mesh size. During start-up straining operations monitor the pressure drop across the strainer and change the strainer medium when it is loaded. Each change of the medium should use a finer mesh until the desired level of particulate size and concentration is reached. On systems having a continuing influx of particulate, such as systems from cooling towers at grade level in sandy areas or from in filtration to underground piping systems, it is desirable to provide a centrifugal-type separator in the circulating lines.

Degreasing must be coordinated with cleaning and pretreatment by a person familiar with chemical reactions, to avoid injury to personnel and damage to the piping systems during degreasing.

Pretreatment must be carried out carefully, since it is usually done with system pumps running and with fairly high concentrations of chemicals being fed into the system.

Damage to the pump shaft seals often results from improperly performed cleaning, degreasing

and pretreatment operations. The water used in filling the system must be clean and pure. Domestic potable water is acceptable.

**Stuffing Boxes and Packing Glands:** Adjust stuffing boxes on pump shafts and packing glands on valve stems. In all packing materials, there is a lubricant to ease the friction of rotation. In pumps, the frictional heat generated is liquid cooled. Adjustment of pump stuffing boxes requires that some leakage take place during operation. To stop leaks on stuffing boxes is to cause damage by overheating the packing and the shaft. Valve packing, on the other hand, can be adjusted tight enough to stop leaks, though not tight enough to bind the stem.

**Motor Rotation and Overload Heaters:**

Visually inspect and verify motor rotation after final connections are made to the permanent transformer bank.

Check and record the overload heater data and operating conditions. The first step is to abstract the motor nameplate amps, then read the motor full-load current and the voltage at the terminal box. If the applied voltage is different from the motor nameplate, determine whether or not the applied voltage is within the range allowed under the motor guarantee. If not, take the necessary action to change the motor or the applied voltage.

When the voltage varies from the nameplate value but is within the allowable range, compute the equivalent amperage at nameplate voltage and compare it to the overload heater amperage rating range. At this time, consider whether the ambient temperature of the starter is above, below or the same as the ambient temperature of the motor. If the two ambient temperatures are not the same, use overload heaters of higher range for hot area starters or of lower range for cold area starters, to compensate the heater trip point for heat gains or losses within the environment.

**Alignment of Drives:** Align drives, both belt and direct coupled, and adjust belt tension. For axial alignment of shaft couplings, check end clearance between shafts as a final step. With single-groove fixed and variable pitch sleeves, align the drive with the faces of both sheaves parallel and on the same centerline. With multiple-groove variable pitch sheaves driving fixed pitch sheaves, align the drives with the sheave faces parallel and with centerlines of the grooved widths on the sheaves in line.

**Control Diagrams and Sequences:** Have system control diagrams and sequences of operation corrected to “as installed”, reflecting changes brought by contract modifications and changes effected to make the installed system control the building systems as was intended. Display as described in the GRAPHICS portion of this section.

**Safety and Operating Control Setpoints:** Check safety and operating controls of equipment and operationally check associated control sequences, such as condenser water bypass valves, cooling tower fan cycling and pump pressure bypass.

**Cleaning the Installation—**thoroughly clean the external portion of this installation, either in preparation for finish painting or for final acceptance of the project. This may include any or all of the following:

- Removal of temporary coverings installed for protection of the work.

- Removal of adhesive stickers, except those that give specific maintenance instructions or that are otherwise intended to remain for use.

- Removal of tags affixed by cord or wire—except permanent identification tags.

- Cleaning painted and inked markings—except equipment identification stencils.

- Washing down surfaces that are to receive finish painting, using compounds intended for that purpose.

- Cleaning of other surfaces, either those with a factory finish or those that are not to receive

any other finish—so that they will be clean for final acceptance.

Cleaning paint splatters and drips from insulation installation and finishing.

Cleaning the inside of control box cabinets to remove dirt and scrap material from connections to the panel, by blowing with compressed air or by vacuum cleaning techniques.

Painting: Touch up factory finishes that have been marred. Scratches and abrasions can be prepared by light sanding or by removing rust with chemical compounds, such as naval jelly. They can then be coated with a compatible primer, followed by a matching topcoat. Where major damage has occurred on a finished surface, the entire piece should be refinished or replaced. Paint black steel and iron that is exposed to view, using a primer and topcoat system, following the manufacturer's instructions for surface preparation and application of the paints.

Identification of Equipment, Piping and Valves: Identification procedures are covered in Section 15010 – “Basic Mechanical Requirements”.

Fin Straightening: Inspect finned surfaces of heat transfer coils and repair damaged fins. Where plate-type fins are bent, comb out the fins using combs available for each fin spacing. Where helical wound fins are bent, straighten the fins with a blunt blade, such as a putty knife, and inspect for separation of the fin from the tube. Heavy fin damage may call for rejection of the coil.

Maintenance Manuals: Provide for the preparation of manuals containing operational and maintenance data for the systems as specified in Section 15010 – “Basic Mechanical Requirements”.

Instructions to Owner's Operating and Maintenance Personnel: Provide formal instruction sessions for the building operating and maintenance staff. Organize sessions to review the operating and maintenance manuals, followed by a walking tour of the building for review and identification of the elements of each system. A receipt for completed sessions should be obtained from the Owner's representative.

Graphic Operational Data: Provide copies of data prepared for other sections, arranged and displayed to illustrate operational data. In some cases, it will be desirable to set up operating instructions on a step-by-step basis, with a framed set of instructions in large print coordinated with large numbers at each switch or other device to be operated. The usual graphic operational data will include simple daily start/stop instructions and seasonal changeover instructions, piping identification legends, valve identification schedules and diagrams, lubrication schedules and control diagrams with operating sequences.

Water Treatment Program: Provide for a complete chemical water treatment program with preliminary water testing, recommendations for chemical doses and feeding methods for each system, monthly testing of system under treatment, services of a consulting chemist, and a supply of chemicals for one year of operation, as specified.

## **CHECK LISTS FOLLOW**

**Project:** \_\_\_\_\_

Checklist of Start-Up Procedures:

**Instructions: Initial each line item below when completed.**

1. Pre-Start-Up Inspection:
  - a. \_\_\_\_\_ Verify proper equipment mounting and setting.
  - b. \_\_\_\_\_ Verify that control, interlock and power wiring is complete.
  - c. \_\_\_\_\_ Verify alignment of motors and drives.
  - d. \_\_\_\_\_ Verify proper piping connections and accessories.
  - e. \_\_\_\_\_ Verify air distribution product installation is completed.
  - f. \_\_\_\_\_ Verify that filter installation is completed.
  - g. \_\_\_\_\_ Verify that lubrication of equipment is completed.
  - h. \_\_\_\_\_ Verify that instrumentation installation is completed.
  - i. \_\_\_\_\_ Verify that hydronic systems have been cleaned and filled with heat transfer fluid.
  - j. \_\_\_\_\_ Verify that strainers are clean.
  - k. \_\_\_\_\_ Verify that refrigeration systems have been leak tested, evacuated and filled with refrigerant and fresh oil.
2. First Run Observations:
  - a. \_\_\_\_\_ Verify direction of rotation.
  - b. \_\_\_\_\_ Verify setting of safety controls.
  - c. \_\_\_\_\_ Monitor heat build-up in bearings.
  - d. \_\_\_\_\_ Check motor loads against nameplate.
  - e. \_\_\_\_\_ Purge air from hydronic systems.
3. Equipment Check:
  - A. \_\_\_\_\_ Verify proper overload heater sizes.
  - B. \_\_\_\_\_ Verify function of safety and operating controls.
  - C. \_\_\_\_\_ Verify proper operation of equipment.
  - D. \_\_\_\_\_ Report on inspection, observation and checking procedures.

**Project:** \_\_\_\_\_

**Systems Start-Up Checklist:**

1. \_\_\_\_\_ System pre-start-up is complete.
2. \_\_\_\_\_ Stuffing boxes and packing glands on pumps and valves have been adjusted.
3. \_\_\_\_\_ Rotation of electric motor and ratings of overload heaters has been verified.
4. \_\_\_\_\_ Rotating equipment has been aligned and belt drive tension has been adjusted.
5. \_\_\_\_\_ Control diagrams and sequences have been corrected to "as-built".
6. \_\_\_\_\_ Safety and operating control setpoints are as designed and automatic control sequences have been checked.
7. \_\_\_\_\_ Installation has been cleaned up and temporary coverings, stickers and tags removed.
8. \_\_\_\_\_ Painted finishes have been touched up where damaged.
9. \_\_\_\_\_ Equipment and piping identification work has been completed with valve tags, schedules and piping identification system.
10. \_\_\_\_\_ Fins on extended-surface heat transfer coils have been combed out where damaged.
11. \_\_\_\_\_ One set of operating and maintenance manuals have been prepared especially for use by testing and balancing technicians.
12. \_\_\_\_\_ Building operating and maintenance personnel have been instructed in all aspects of system operation and maintenance.
13. \_\_\_\_\_ Graphic operational data such as start/stop instructions, valve tag schedules, and piping identification schedules have been provided where needed.
14. \_\_\_\_\_ Water treatment program has been implemented, with initial qualitative testing of fluids in systems and domestic water supply, check of chemical feeder equipment, and instructions to chemical supplier as to results desired.
15. \_\_\_\_\_ Closeout documentation has been turned over to Owner.

Project: \_\_\_\_\_

**AHU START-UP DATA SHEET**

**Evaporator Fan Motor**

Horsepower \_\_\_\_\_  
F.L.A. \_\_\_\_\_  
Rotation \_\_\_\_\_  
Fan Belt Size \_\_\_\_\_  
Fan Speed Setting  
(Direct Drive) \_\_\_\_\_  
Motor R.P.M. \_\_\_\_\_

**Evaporator Coil No. 1**

Supply Air Temp. \_\_\_\_\_ F  
Return Air Temp. \_\_\_\_\_ F  
Outside Air Temp. \_\_\_\_\_ F  
Mixed Air Temp. \_\_\_\_\_ F  
Super Heat \_\_\_\_\_

**Thermostat**

Room Space Temperature \_\_\_\_\_ F  
Temperature Setpoint \_\_\_\_\_  
T'stat Thermometer  
Reading \_\_\_\_\_

**Service Technician/EOR:**

\_\_\_\_\_  
(Print Name)

**I performed/confirmed the start-up of  
above noted equipment and  
certify that this information is  
true and correct to the best of  
my knowledge.**

**Signed:** \_\_\_\_\_

**Dated:** \_\_\_\_\_

**START-UP CHECKLIST FOR CHILLER**

**A. Preliminary Information**

JOB NAME \_\_\_\_\_

LOCATION \_\_\_\_\_

INSTALLING CONTRACTOR \_\_\_\_\_

START-UP PERFORMED BY \_\_\_\_\_

**EQUIPMENT:**

MODEL \_\_\_\_\_

S/N \_\_\_\_\_

**COMPRESSORS:**

CIRCUIT A

1) MODEL # \_\_\_\_\_  
# \_\_\_\_\_

S/N \_\_\_\_\_

2) MODEL # \_\_\_\_\_  
# \_\_\_\_\_

S/N \_\_\_\_\_

CIRCUIT B

1) MODEL

S/N \_\_\_\_\_

2) MODEL

S/N \_\_\_\_\_

**COOLER:**

MODEL # \_\_\_\_\_

S/N \_\_\_\_\_

**CONDENSER: (30HX ONLY)**

MODEL # \_\_\_\_\_

S/N \_\_\_\_\_

**AIR-HANDLING EQUIPMENT:**

MANUFACTURER \_\_\_\_\_

MODEL # \_\_\_\_\_ S/N \_\_\_\_\_

ADDITIONAL AIR-HANDLING UNITS AND ACCESSORIES \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**B. Preliminary Equipment Check**

IS THERE ANY SHIPPING DAMAGE? \_\_\_\_\_ IF SO, WHERE \_\_\_\_\_

UNIT IS LEVEL IN ITS INSTALLATION

UNIT IS SUPPLIED WITH THE PROPER CONTROL VOLTAGE \_\_\_\_\_ VAC

ELECTRICAL CIRCUIT WIRING HAS BEEN SIZED AND INSTALLED PROPERLY

UNIT GROUND WIRE HAS BEEN CONNECTED

ELECTRICAL CIRCUIT PROTECTION HAS BEEN SIZED AND INSTALLED PROPERLY

ALL TERMINALS ARE TIGHT

**CHECK AIR-HANDLING SYSTEM**

ALL AIR HANDLERS ARE OPERATING \_\_\_\_\_

ALL CHILLED WATER VALVES ARE OPEN \_\_\_\_\_

ALL FLUID PIPING IS CONNECTED PROPERLY \_\_\_\_\_

ALL AIR HAS BEEN VENTED FROM THE SYSTEM \_\_\_\_\_

CHILLED WATER PUMP (CWP) IS OPERATING WITH THE CORRECT ROTATION \_\_\_\_\_

CWP AMPERAGE:      RATED: \_\_\_\_\_ ACTUAL: \_\_\_\_\_

PUMP PRESSURES:      INLET: \_\_\_\_\_ OUTLET: \_\_\_\_\_

**C. Unit Start-Up**

OIL HEATERS HAVE BEEN ENERGIZED FOR AT LEAST 24 HOURS \_\_\_\_\_

ALL LIQUID VALVES ARE BACKSEATED \_\_\_\_\_

ALL DISCHARGE VALVES ARE OPEN \_\_\_\_\_

ALL SUCTION VALVES ARE OPEN, IF EQUIPPED \_\_\_\_\_

ALL OIL LINE VALVES ARE OPEN \_\_\_\_\_

UNIT HAS BEEN LEAK CHECKED \_\_\_\_\_

LOCATE, REPAIR, AND REPORT ANY REFRIGERANT LEAKS \_\_\_\_\_

CHECK VOLTAGE IMBALANCE:                      AB \_\_\_\_\_ AC \_\_\_\_\_ BC \_\_\_\_\_

AVERAGE VOLTAGE      = \_\_\_\_\_

MAXIMUM DEVIATION = \_\_\_\_\_

VOLTAGE IMBALANCE = \_\_\_\_\_

VOLTAGE IMBALANCE IS LESS THAN 2% \_\_\_\_\_

ALL INCOMING POWER VOLTAGE IS WITHIN RATED VOLTAGE RANGE \_\_\_\_\_

**CHECK COOLER WATER LOOP:**

WATER LOOP DESIGN VOLUME: \_\_\_\_\_ GALLONS (LITERS)

CALCULATED VOLUME \_\_\_\_\_ GALLONS (LITERS)

3 GALLONS/NOMINAL TON FOR AIR CONDITIONING \_\_\_\_\_

PROPER LOOP VOLUME ESTABLISHED \_\_\_\_\_

PROPER LOOP CORROSION INHIBITOR INCLUDED \_\_\_\_\_ GALLONS (LITERS) OF

INLET PIPING TO COOLER INCLUDES A 40 MESH STRAINER \_\_\_\_\_

**CHECK PRESSURE DROP ACROSS THE COOLER**

ENTERING COOLER: \_\_\_\_\_ PSIG (kPa)

LEAVING COOLER: \_\_\_\_\_ PSIG (kPa)

(LEAVING - ENTERING) × 2.31 FT OF H<sub>2</sub>O/PSIG = \_\_\_\_\_ FT OF H<sub>2</sub>O

(LEAVING - ENTERING) × 0.334 M OF H<sub>2</sub>O/kPa = \_\_\_\_\_ M OF H<sub>2</sub>O

PLOT COOLER PRESSURE DROP ON PERFORMANCE DATA CHART (IN PRODUCT DATA LITERATURE) TO DETERMINE TOTAL GALLONS/MINUTE (GPM) OR LITERS PER SECOND (L/S) AND FIND UNIT'S MINIMUM FLOW RATE.

TOTAL GPM: \_\_\_\_\_

GPM/NOMINAL TON = \_\_\_\_\_

TOTAL GPM IS GREATER THAN UNIT'S MINIMUM FLOW RATE \_\_\_\_\_

TOTAL GPM MEETS JOB SPECIFIED REQUIREMENT OF \_\_\_\_\_ GPM (L/S)

COOLER HEATER FUSE INSTALLED, AND HEATERS ARE ACTIVE \_\_\_\_\_

**TEMPERATURES AND PRESSURES:**

ONCE THE MACHINE HAS BEEN OPERATING FOR A WHILE AND THE TEMPERATURES AND PRESSURES HAVE STABILIZED, RECORD THE FOLLOWING:

COOLER EWT \_\_\_\_\_  
\_\_\_\_\_

CIR. A DISCHARGE TEMP \_\_\_\_\_

COOLER LWT \_\_\_\_\_

CIR. A LIQUID LINE TEMP \_\_\_\_\_

AMBIENT TEMPERATURE \_\_\_\_\_

CIR. B OIL PRES \_\_\_\_\_

CIR. B SUCTION PRESS \_\_\_\_\_

CIR. B DISCHARGE PRESS \_\_\_\_\_

CIR. A OIL PRESS \_\_\_\_\_

CIR. B DISCHARGE TEMP \_\_\_\_\_

CIR. A SUCTION PRESS \_\_\_\_\_

CIR. B LIQUID LINE TEMP \_\_\_\_\_

NOTES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Service Technician/EOR:**

\_\_\_\_\_  
(Print Name)

I performed/confirmed the start-up of above noted equipment and certify that this information is true and correct to the best of my knowledge.

Signed: \_\_\_\_\_

Dated: \_\_\_\_\_

**6450-01-P**

**DEPARTMENT OF ENERGY**

**Office of Energy Efficiency and Renewable Energy**

**Nationwide Limited Public Interest Waivers under Section 1605 (Buy American) of the American Recovery and Reinvestment Act of 2009 (Recovery Act)**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy (DOE).

**NOTICE:** Buy American Exception under the American Recovery and Reinvestment Act of 2009

**SUMMARY:** The Office of Energy Efficiency and Renewable Energy (EERE) of the U.S. Department of Energy hereby provides notice that on March 19, 2010, the Assistant Secretary for EERE granted nationwide limited waivers of the Buy American requirements of the American Recovery and Reinvestment Act of 2009 (Recovery Act; Pub. L. 111-5) under the authority of section 1605(b)(1) [application of the restrictions of section 1605 would be inconsistent with the public interest] for the purchase of light-emitting diode LED lighting (lamps, fixtures, and any supporting components) and heating, ventilation and air conditioning (HVAC) units. These nationwide limited waivers apply to projects using EERE Recovery Act funds for the construction, alteration, maintenance and repair of a public building or public work. These limited waivers only apply in circumstances where the recipient of EERE Recovery Act funds (“grantee”) has taken substantial steps to commit funds for the purchase of LED lights or HVAC units between February 17, 2009 and March 31, 2010. Substantial steps to commit funds would include, but are not limited to, (1) issuing a Request for Proposals

(RFP) on or before March 31, 2010 (applicable only where the grantee accepts a proposal received under that RFP); (2) in the case of a sole source selection: placing an order for the goods on or before March 31, 2010; (3) commencing a bidding process on or before March 31, 2010; (4) in circumstances where the grantee solicited quotes without an RFP: the grantee purchases the goods based on a quote dated on or before March 31, 2010 and the order for the goods is placed on or before March 31, 2010; and (5) grantee has executed a contract or purchase agreement with a supplier to acquire affected goods between February 17, 2009 and March 31, 2010.

On March 31, 2010, these limited waivers of Buy American provisions will expire, with the exception of LED traffic lights, arrows, and crosswalk signals, which are covered by a nationwide categorical waiver based on domestic nonavailability issued on February 11, 2010. After March 31, 2010, EERE grantees are required to procure LED lighting and HVAC units from domestic manufacturers in accordance with the Recovery Act Buy American provisions.

**DATES:** Effective Date: March 19, 2010.

**FOR FURTHER INFORMATION CONTACT:** Benjamin Goldstein, Energy Technology Program Specialist, Office of Energy Efficiency and Renewable Energy (EERE), (202) 287-1553, Department of Energy, 1000 Independence Avenue SW., Mailstop EE-2K, Washington, DC 20585.

**SUPPLEMENTARY INFORMATION:** Section 1605 of the Recovery Act prohibits the use of recovery funds for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States, or unless a waiver is granted by the head of the Federal department or agency. A waiver may be granted if the head of the Federal department or agency determines that one of three listed exceptions applies: (1) the application of Section 1605 requirements would be inconsistent with the public interest; (2) the iron, steel, or relevant manufactured good is not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or (3) the cost of domestic iron, steel, or relevant manufactured goods will increase the cost of the overall project by more than 25 percent.

In accordance with section 1605(c) of the Recovery Act and Section 176.80 of Title 2 of the Code of Federal Regulations, DOE hereby provides notice that, pursuant to a delegation of authority by the Secretary of Energy, dated November 10, 2009, the Assistant Secretary, EERE, has granted limited nationwide waivers of the requirements of Section 1605 of the Recovery Act for LED lighting (lamps, fixtures, and any supporting components) and heating, ventilation and air conditioning (HVAC) units in circumstances where the recipient of EERE Recovery Act funds (“grantee”) has taken substantial steps to commit funds for the purchase of LED lights or HVAC units between February 17, 2009 and March 31, 2010. Under the authority of section 1605(b)(1) of the Recovery Act, the Assistant Secretary, EERE, has determined that the application of section 1605 requirements in these circumstances would be inconsistent with the public

interest.

The limited waivers for these two categories of manufactured goods are intended to resolve the confusion surrounding the characterization of LED lights and HVAC units as “supply” items, and thus not subject to the Recovery Act Buy American provisions. The concept of the “supply” item has its origins in the Buy American Act (41 U.S.C. 10a - 10d) and the Federal Acquisition Regulation (FAR), neither of which applies to section 1605 of the Recovery Act. The concept of a “supply” item has no significance in the context of section 1605 (the Buy American provisions) of the Recovery Act. The Buy American provisions apply to all iron, steel, and manufactured goods used for a project funded by Recovery Act appropriations for the construction, alteration, maintenance, or repair of a public building or public work. However, there is no requirement with regard to the origin of components or subcomponents in manufactured goods used in the project, as long as the manufacturing occurs in the United States (2 CFR 176.70).

However, it is understandable that a general lack of familiarity with the Buy American provisions would lead Recovery Act stakeholders to reference a similar set of procurement regulations—such as those codified by the FAR and Buy American Act—for guidance in understanding and interpreting section 1605 of the Recovery Act. This confusion ultimately led some recipients of EERE Recovery Act funds to rely on the “supply” item characterization to procure some LED lighting products and HVAC units from foreign manufacturers, without first seeking and obtaining an official waiver of section 1605 of the Recovery Act.

The purpose of the Recovery Act Buy American provisions is to support economic recovery by driving investment into the domestic manufacturing sector and recycling Recovery Act dollars within the U.S. economy. Given that the majority of Recovery Act-related procurement for EERE-funded projects has yet to occur, the Buy American provisions still have ample opportunity to fulfill their purpose and potential. This nationwide limited waiver being issued for LED lighting and HVAC units is critical to resolving the existing confusion, clearly elucidating the requirements of section 1605 of the Recovery Act, and moving forward in a proactive manner.

To support this potential, facilitate the implementation of section 1605 of the Recovery Act, and ensure that Recovery Act funds are deployed expeditiously, EERE is operationalizing a robust and proactive strategy to locate domestic manufacturers for the hard-to-find products sought by grantees. This strategy is outlined in a Request for Information published in Federal Register Vol. 75, No. 23 on Thursday, February 4 (and posted on the EERE Buy American webpage [http://www1.eere.energy.gov/recovery/buy\\_american\\_provision.html](http://www1.eere.energy.gov/recovery/buy_american_provision.html)), and demonstrates EERE's commitment to the fulfillment of the economic and job-creation potential of the Recovery Act Buy American provisions.

Finally, the installation of LED lights and more efficient HVAC units is a proven strategy to achieve impressive energy savings, reduce energy expenditures, and to create immediate jobs in the building, construction, and electrical trades. All three of these

attributes can support near-term economic recovery and long-term sustainability in locations across the country. Hence, the installation of these products has inherently supported the goals of the Recovery Act and—as a popular use of Recovery Act funds by EERE grantees—will continue to do so in the unambiguous regulatory landscape made possible by this nationwide limited waiver.

This SUPPLEMENTARY INFORMATION constitutes the detailed written justification required by Section 1605(c) for waivers based on a finding under subsection (b).

This waiver determination is pursuant to the delegation of authority by the Secretary of Energy to the Assistant Secretary for Energy Efficiency and Renewable Energy with respect to expenditures within the purview of her responsibility. Consequently, this waiver applies to EERE projects carried out under the Recovery Act.

Authority: Pub.L. 111–5, section 1605.



Cathy Zoi  
Assistant Secretary for Energy Efficiency and Renewable Energy  
U.S. Department of Energy

Dated: March 19, 2010



**Department of Energy**  
Washington, DC 20585

In late April and early May, 2009, a series of the Department of Energy (DOE) responses posted on the Energy Efficiency and Conservation Block Grant (EECBG) formula Funding Opportunity Announcement (FOA) FedConnect Q&A database interpreted three categories of manufactured goods (fluorescent lighting ballasts, light-emitting diode (LED) lighting, and Heating, Ventilation and Air Conditioning (HVAC) units) to be “supply items,” and thus not subject to the Buy American provisions. DOE has subsequently concluded that the use of the “supply item” analysis is not determinative of whether or not the Recovery Act Buy American provisions apply.

The concept of the “supply item” has its origins in the Buy American Act (41 U.S.C. 10a - 10d) and the Federal Acquisition Regulation (FAR), neither of which pertain to section 1605 (the Buy American provisions) of the American Recovery and Reinvestment Act of 2009 (Recovery Act; Pub. L. 111-5). Consequently, the notion of a “supply item” has no relevance in the context of section 1605 of the Recovery Act. The Buy American provisions apply to all iron, steel, and manufactured goods used for a project funded by Recovery Act appropriations for the construction, alteration, maintenance, or repair of a public building or public work. There is no requirement with regard to the origin of components or subcomponents in manufactured goods, as long as the manufacturing occurs in the United States (2 CFR 176.70).

To clarify the Buy American regulatory landscape and resolve the confusion surrounding the “supply item” interpretation, the Assistant Secretary for Energy Efficiency and Renewable Energy (EERE) of the U.S. Department of Energy on March 19, 2010, granted a nationwide limited waiver of the Buy American requirements of the Recovery Act under the authority of section 1605(b)(1) [application of the restrictions of section 1605 would be inconsistent with the public interest] for the purchase of LED lighting (lamps, fixtures, and any supporting components) and HVAC units. This nationwide limited waiver applies to projects using EERE Recovery Act funds for the construction, alteration, maintenance and repair of a public building or public work. This limited waiver *only applies* in circumstances where the recipient of EERE Recovery Act funds (“grantee”) has taken substantial steps to commit funds for the purchase of LED lights or HVAC units between February 17, 2009, and March 31, 2010. Substantial steps to commit funds would include, but are not limited to, (1) issuing a Request for Proposals (RFP) on or before March 31, 2010 (applicable only where the grantee accepts a proposal received under that RFP); (2) in the case of a sole source selection: placing an order for the goods on or before March 31, 2010; (3) commencing a bidding process on or before March 31, 2010; (4) in circumstances where the grantee solicited quotes without an RFP: the grantee purchases the goods based on a quote dated on or before March 31, 2010 and the order for the goods is placed on or before March 31, 2010; and (5) grantee has executed a contract or purchase agreement with a supplier to acquire affected goods between February 17, 2009, and March 31, 2010.

On March 31, 2010, this nationwide limited waiver of the Recovery Act Buy American provisions will expire. After March 31, 2010, EERE grantees are required to procure LED lighting and HVAC units from domestic manufacturers in accordance with the Recovery Act Buy American provisions (with the exception of LED traffic lights, arrows, and crosswalk signals, which are covered by a nationwide categorical waiver based on domestic nonavailability issued on February 11, 2010).

On February 11, 2010, the Assistant Secretary of Energy for Energy Efficiency and Renewable Energy issued a nationwide categorical waiver of the Buy American requirements of Recovery Act section 1605 under the authority of section 1605(b)(2) [iron, steel, and the relevant manufactured goods are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality] for the purchase of fluorescent electronic lighting ballasts (with the exception of electronic dimming ballasts for fluorescent lamps that are capable of operating the lamps below 50 percent of their rated light output), and screw-base and pin-base compact fluorescent lamps (with the exception of plug-in CFLs longer than 10 inches). The nationwide categorical waiver for these products, along with the LED traffic lights, arrows, and crosswalk signals mentioned above, is independent from the limited public interest waiver for LED lighting and HVAC units, and does not expire on March 31, 2010.

The purpose of the Recovery Act Buy American provisions is to support economic recovery by driving investment into the domestic manufacturing sector and recycling

Recovery Act dollars within the U.S. economy. Given that the majority of Recovery Act-related procurement for EERE-funded projects has yet to occur, the Buy American provisions still have ample opportunity to fulfill their purpose and potential. The nationwide limited public interest waiver being issued for LED lighting and HVAC units is critical to resolving the confusion surrounding the “supply” analysis, clearly elucidating the requirements of section 1605 of the Recovery Act, and moving forward in a proactive manner.

Any additional questions regarding the Recovery Act Buy American provisions should be directed to the project officer for the relevant grant, and to the EERE Buy American coordinator at [buyamerican@ee.doe.gov](mailto:buyamerican@ee.doe.gov).