SECTION 23 54 00

##### Gas Fired furnaces

### BASED ON DFD MASTER SPECIFICATION DATED 10/1/2012

***This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.***

**PART 1 ‑ GENERAL**

**SCOPE**

This section includes specifications for gas fired furnaces. Included are the following topics:

PART 1 - GENERAL

Scope

Related Work

Reference

Reference Standards

Quality Assurance

Energy Efficiency

Submittals

Operation and Maintenance Data

Warranty

PART 2 - PRODUCTS

Furnaces

PART 3 - EXECUTION

Installation

Furnaces

Construction Verification Items

Functional Performance Testing

Agency Training

**RELATED WORK**

Section 01 91 01 or 01 91 02 – Commissioning Process

Section 23 08 00 – Commissioning of HVAC

Section 23 11 00 - Facility Fuel PipingSection 23 05 23 - General-Duty Valves for HVAC Piping

Section 23 05 13 - Common Motor Requirements for HVAC Equipment

Section 23 51 00 - Breechings, Chimneys, and Stacks

**REFERENCE**

Applicable provisions of Division 1 govern work under this section.

**Reference Standards**

AGA American Gas Association

ANSI Z21.64 Direct Vent Central Furnaces

GAMA Gas Appliance Manufacturers Association

NEC National Electrical Code

# QUALITY ASSURANCE

Refer to division 1, General Conditions, Equals and Substitutions.

**ENERGY EFFICIENCY**

Provide gas furnaces that bear the ENERGY STAR label and meet the ENERGY STAR specifications for energy efficiency.

**SUBMITTALS**

Refer to division 1, General Conditions, Submittals.

Include specific manufacturer and model numbers, equipment identification corresponding to project drawings and schedules, dimensions, capacities, materials of construction, ratings, weights, power requirements and wiring diagrams, filter information and information for all accessories.

# OPERATION AND MAINTENANCE DATA

All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

***Delete the following if there are no additional requirements.***

In addition to the general content specified under GENERAL REQUIREMENTS supply the following additional documentation:

1. ***[A/E and commissioning provider to define detailed operation and maintenance data requirements for equipment specifications added to this section.]***

# WARRANTY

Furnace primary and secondary heat exchangers warranted for 20 years under normal use and maintenance. Remainder of furnace components warranted for 1 year from date of start up.

**PART 2 ‑ PRODUCTS**

**FURNACES**

Manufacturers: Bryant, Carrier, Lennox, Trane or York.

***This specification is for a sealed combustion condensing type furnace.***

Direct vent, sealed combustion, condensing type AGA certified for use with [natural][propane] gas. Minimum annual fuel utilization efficiency (A.F.U.E.) of 91. All ratings are to be certified by GAMA. All wiring shall comply with the National Electrical Code.

22 gauge steel casing with baked enamel finish or prepainted galvanized steel. Insulate casing back and side panels with foil faced fiberglass insulation.

Construct primary heat exchanger of aluminized steel. Construct secondary heat exchanger of stainless steel with aluminum fins or of polypropylene laminated steel. Aluminized steel multi-port in-shot burner with hot surface or electronic spark ignition, approved for vertical or sidewall venting.

AGA listed gas controls including manual main shut‑off valve, double automatic gas valves for redundancy and gas pressure regulator.

Centrifugal type blower fan statically and dynamically balanced with multiple speed, direct drive or belt drive fan motor. Provide low energy induced draft blower for heat exchanger prepurge and combustion gas venting.

Provide unit with 2” thick 30% efficient disposable type panel air filter and filter holding rack with a maximum filter face velocity of [ ] fpm.

Determine what filter pressure drop is acceptable for the system design. Design or specify a filter arrangement that will allow for sufficiently low filter face velocities.

Provide solid state integral control unit with all necessary controls and relays including but not limited to:

-Pressure switch for airflow of flue products through furnace and out vent system

-Rollout switch with manual reset to prevent overtemperature in burner area

-Electronic flame sensor

-Blower access safety interlock

-Timed blower start after main burners ignite

-Factory installed 24 v transformer for controls and thermostat

-LED’s to indicate status and to aid in troubleshooting

***For combination heating/cooling units include the following.***

Provide unit with matching cased "A" configuration cooling coil for upflow units, "V" configuration cooling coil for downflow units, and vertical flat face configuration cooling coil for horizontal units.

Minimum 1/2" OD seamless copper tubing mechanically bonded to heavy ripple edged aluminum fins with thermal expansion valve, holding charge and copper tube stubs for field piping.

Non-corrosive stainless steel or polymer drain pan with 3/4" NPT drain connection.

20 gauge steel Coil casing with baked enamel finish and fiberglass insulation.

[Refer to Sections [23 09 24][23 09 23][23 09 14 OR 23 09 15] for temperature control work.]

***If temperature controls are not included elsewhere in the documents specify all control work under this section by deleting the above sentence and editing the following. If temperature controls are included in other sections then delete the following.***

[This Contractor shall provide all temperature control and interlocking necessary to perform the specified control sequence. All wiring is to be in conduit in accordance with Division 26 00 00 - Electrical. All relays, transformers and controls are to be in enclosures.

Provide a 7 day programmable thermostat with 2 occupied periods per day, automatic changeover, separate heating and cooling set points for both occupied and unoccupied modes. Provide auxiliary controls on sub-base to open minimum outside air damper during occupied mode. Equal to Honeywell model T7300 with Q7300 sub-base.

Provide lockable thermostat guards in public spaces.

During occupied mode run the supply fan continuously, open the outside air damper and cycle the cooling or heating as required to maintain occupied space temperature cooling or heating set point. During unoccupied mode close the outside air damper and cycle the supply fan and cooling or heating as required to maintain unoccupied cooling or heating space temperature set point.]

**PART 3 ‑ EXECUTION**

**INSTALLATION**

Install units as shown on plans, as detailed and according to the manufacturer’s installation instructions.

Pipe vents from gas regulator to outside (where regulators are provided).

[Install remote panels and thermostats where indicated on the drawings. Provide all wiring between remote panels/thermostats and the gas fired item.]

Coordinate all power wiring with the electrical consultant. Coordinate all temperature controls with the temperature controls specifications. Clearly identify and coordinate which trade is providing the various wiring.

***Show routing, sizing and termination of all gas ,gas vent , combustion air and vent piping on the drawings.***

 ***Coordinate exterior wall/roof penetrations with the building wall/roof type and configuration.***

# FURNACES

Install on concrete housekeeping pad, steel stand or suspend unit from structure as indicated on the drawings. Pipe condensate to floor drain.

Provide schedule 40 PVC, ASTM D1785 combustion air and vent piping and fittings with solvent welded joints as indicated on the drawings. Terminate as recommended by the furnace manufacturer.

**CONSTRUCTION VERIFICATION**

Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 23 08 00 in accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.

**FUNCTIONAL PERFORMANCE TESTING**

Contractor is responsible for utilizing the functional performance test forms supplied under specification Section 23 08 00 in accordance with the procedures defined for functional performance testing in Section 01 91 01 or 01 91 02.

# AGENCY TRAINING

All training provided for agency shall comply with the format, general content requirements and submission guidelines specified under Section 01 91 01 or 01 91 02.

Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of [XX] hours.

END OF SECTION