

## Guide Specifications

### MERIT® SERIES

### ML193

### Downflow–Upflow/Horizontal

September 5, 2012



**Note:** This specification is for **Lennox Industries ML193UH and ML193DF Gas Furnace**. Revise specification section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

This specification utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat™*, *SectionFormat™* and *PageFormat™*. Optional text and text requiring a decision is indicated by bolded brackets [ ]; delete text not required in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

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## FURNACES

### SECTION 23 54 00

#### PART 1 - GENERAL

##### 1.1 SECTION INCLUDE

###### A. Gas Furnaces

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

##### 1.2 RELATED SECTIONS

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section. Retain only those reference standards to be used within the text of this Section. Add and delete as required for specific project.

##### 1.3 REFERENCES

- A. Canadian Standards Association (CSA) certified
- B. Department of Energy (DOE), units rated to
- C. ISO 9001 manufacturer quality system
- D. California Energy Commission approved
- E. X Models Meet:
  - 1. California seasonal efficiency requirements
  - 2. California Nitrogen Oxides (NOx) Standards

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together and to interface with other systems.

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Nominal gas heat input: 045=44,000 btuh , 070=66,000 btuh, 090=88,000 btuh, 110=110,000 btuh

Specifier Note: ML193UH has additional nominal gas heat input of 135=132,000 btuh.

B. Annual Fuel Utilization Efficiency (AFUE): 93%

C. High Static: 0.50 in. w.g. (124 Pa)

Specifier Note: ML193UH has nominal cooling capacity of 2- to 5-tons and ML193DF has nominal cooling capacity of 3- to 5-tons.

D. Nominal Add-on Cooling Capacity: [2- to 5- tons][3- to 5-tons]

E. Electrical Characteristics

1. 60 HZ
2. 120 V
3. Single Phase
4. 24V Transformer
5. Fuel Requirements: [Natural Gas] [and][/][or] [LPG/Propane Gas]

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

## 1.5 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures

B. Product Data: Submit product data, including manufacturer's SPEC-DATA® product sheet, for specified products

C. Shop Drawings:

1. Submit shop drawings in accordance with Section [01 33 00 - Submittal Procedures]
2. Indicate:
  - a. Equipment, piping and connections, together with valves, strainers, control assemblies, thermostatic controls, auxiliaries and hardware and recommended ancillaries which are mounted, wired and piped ready for final connection to building system, its size and recommended bypass connections.
  - b. Piping, valves and fittings shipped loose showing final location in assembly
  - c. Control equipment shipped loose, showing final location in assembly
  - d. Field wiring diagrams
  - e. Dimensions, internal and external construction details, installation clearances, recommended method of installation, sizes and location of mounting bolt holes
  - f. Detailed composite wiring diagrams for control systems showing factory installed wiring and equipment on packaged equipment or required for controlling devices or ancillaries, accessories, controllers.

D. Quality Assurance:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties

2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements
3. Manufacturer's Instructions: Manufacturer's installation instructions

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article herein. Retain or delete as applicable.

- E. Manufacturer's Field Reports: Manufacturer's field reports specified herein
- F. Closeout Submittals: Submit the following:
  1. Warranty: Warranty documents specified herein
  2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance. Include names and addresses of spare part suppliers.
  3. Provide brief description of unit, with details of function, operation, control and component service
  4. Commissioning Report: Submit commissioning reports, report forms and schematics in accordance with Section [01 81 00 – Commissioning]

## **1.6 QUALITY ASSURANCE**

- A. Qualifications:
  1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project
  2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and approving application method
- B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 1 Project Management and Coordination (Project Meetings).

## **1.7 DELIVERY, STORAGE & HANDLING**

- A. General: Comply with Division 1 Product Requirements
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays
- C. Packing, Shipping, Handling and Delivery:
  1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact
  2. Ship, handle and unload units according to manufacturer's instructions
- D. Storage and Protection:
  1. Store materials protected from exposure to harmful weather conditions

2. Factory shipping covers to remain in place until installation

Specifier Note: Coordinate article below with Conditions of the Contract and Division 1 Closeout Submittals (Warranty).

## 1.8 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents

Specifier Note: Coordinate paragraph below with manufacturer's warranty requirements.

- C. Warranty: Commencing on Date of Installation

Specifier Note: Refer to Lennox Equipment Limited Warranty certificate included with equipment for details.

1. Duralok™ Aluminized Steel Heat Exchanger - Limited 20-year warranty in residential applications , 10-year in non-residential applications
2. All other covered components - Limited 5-year warranty in residential applications, 1-year in non-residential applications

## PART 2 - PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

### 2.1 GAS FURNACE

- A. Product: [Downflow][Upflow/Horizontal] Gas Furnace
- B. Manufacturer: Lennox Industries
  1. Contact: 2140 Lake Park Blvd.; Richardson, TX 75080; Telephone: (800) 453-6669; website: [www.lennoxcommercial.com](http://www.lennoxcommercial.com)
- C. Proprietary Products/Systems:
  1. Cabinet:
    - a. Low-profile, narrow width cabinet allows easy installation
    - b. Heavy gauge cold rolled steel construction
    - c. Pre-painted finish
    - d. Flanges provided on supply air opening for ease of plenum connection or alignment with indoor coil
    - e. Foil faced insulation on sides and back of heating compartment

- f. Gas piping inlets and electrical inlets in both sides
- g. Safety interlock switch to automatically shut off power to unit when blower compartment access panel is removed
- h. Coil match-up

Specifier Note: The following option on cabinet is only used for ML193UH applications.

- i. Return Air Entry
2. Heating System:
- a. Lennox Duralok Plus<sup>®</sup> Heat Exchanger Assembly
    - 1. Heavy gauge aluminized steel
    - 2. Multi-pass crimped seam design clamshell
    - 3. Secondary heat exchanger condenser coil constructed of aluminum fins fitted to stainless steel tubes
    - 4. Coil is factory tested for leaks
    - 5. Laboratory life-cycle tested
    - 6. Condensate drain header box assembly located in front of coil
  - b. Lennox designed header box
    - 1. Collects flue condensate for disposal through drains
    - 2. Drains are located on each side of cabinet
    - 3. Condensate drain trap is included for field installation
  - c. Lennox designed flue condensate trap assembly
    - 1. Mounted outside the conditioned air stream on either side of cabinet in upflow and downflow applications
    - 2. Mounted below the cabinet in horizontal applications (or remotely up to 5ft away from unit)
    - 3. Drain cap on trap for easy cleaning and winterizing
    - 4. 90 degree street elbow furnished for ease of drain trap installation
    - 5. Connections can be made with fields provided PVC pipe, PVC coupling, or vinyl tubing with hose clamp
  - d. Inshot Burners
    - 1. Aluminized steel, trouble free operation
    - 2. Burner assembly to be removable from unit as single component
  - e. SureLight<sup>®</sup> Hot Surface Ignitor
    - 1. Tough, reliable, long life, trouble-free performance
    - 2. Silicon nitride ignitor
    - 3. Ignition leads are constructed of nickel plated copper, enclosed in high temperature Teflon<sup>®</sup> insulation
    - 4. Cemented to steatite block for leakage protection
  - f. Two-Stage Gas Control Valve
    - 1. 24 V
    - 2. Redundant combination

- 3. Compact Control to contain Manual shutoff, automatic electric valve (dual) and gas pressure regulation
- g. Combustion Air Inducer
  - 1. Shaded pole heavy duty blower prepurges heat exchanger and safety vents flue products
- h. Flame Rollout Switches (2)
  - 1. Factory installed on burner box with manual reset for protection from abnormal operating conditions
- i. Limit control
- j. Pressure switch
- 3. Venting
  - a. Direct Vent or Non-Direct Vent
- 4. Blower
  - b. Multi Speed Direct drive blower
  - c. Statically and dynamically balanced
  - d. Resiliently mounted
  - e. Easily removed for servicing
  - f. Blower speeds are easily changed on the Integrated Furnace Control
- 5. Controls
  - a. 24 Volt Transformer
    - 1. Furnished and factory installed in control box
    - 2. 40VA transformer has circuit breaker wired in series
  - b. Field Wiring Make-up Box
    - 1. For line voltage wiring
    - 2. Factory installed internally on left side of furnace
    - 3. Box may be installed internally or externally on either

Specifier Note: ML193DF applications have Integrated Furnace Control and ML193UH applications have Surelight® Integrated Furnace Control.

- c. [Surelight® Integrated Furnace Control] or [Integrated Furnace Control ]
  - 1. Controls combustion air inducer
  - 2. Contains all necessary controls and relays to operate furnace
  - 3. Flame sensor assures safe and reliable operation
  - 4. Ignition control has a red LED to indicate status for troubleshooting
- 6. [Optional Accessories:]
  - a. [Venting:]
    - 1. [Termination kits]
    - 2. [Concentric termination kit (direct vent)]
    - 3. [Flush-Mount termination kit]
    - 4. [Wall assembly termination kit (direct vent)]

5. [Wall Ring]
6. [Close Couple WTK(Canada only)(direct vent)]
7. [Close Couple (US only)(direct vent)]
8. [Roof Termination Flashing Kit]

**b. [Cabinet:]**

1. [Condensate Drain Heat Cable Kits]
2. [Heat Cable Tape:]
  - 1.[66 ft. length, 1/2 in. wide fiberglass]
  - 2.[60 ft. length, 2 in. wide aluminum foil]
3. [Crawl Space Vent Drain Kit]
  - 1.[Allows venting through a crawl space]

Specifier Note: the following two options are only available for ML193UH applications.

4. [Horizontal Suspension Kit]
5. [Return Air Base]

Specifier Note: the following option is only available for ML193DF applications.

6. [Downflow Combustible Flooring Base]
  - 1.[Required for heating only units installed on combustible floors]
  - 2.[Not required in add-on cooling applications]

**c. [Controls:]**

1. [High Altitude Orifice Kit]
2. [High Altitude Pressure Switch Kit]
3. [Natural Gas to LPG/Propane Conversion Kit]
4. [LPG/Propane to Natural Gas Conversion Kit]
5. [Furnace Twinning Kit: consists of twinning control and two fan sensors]
6. [Night Service Kit]
7. [Thermostat]

Specifier Note: the following option is only available for ML193DF applications.

8. [Universal Service Kit-Switches]

Specifier Note: the following option is only available for ML193UH applications.

9. [Vent Adaptor (Upflow applications only)]
10. [Safety Night Service Kit]

**d. [Filter:]**

Specifier Note: the following option is only available for ML193DF applications.

1. [Downflow Filter Cabinet]
  1. [Filter cabinet mounts directly on top of furnace]
  2. [“B and “C” width cabinets have two filters]
  3. [Filter rails are furnished]
  4. [Front access for servicing]



5. [Cleanable filter(s) are furnished]

Specifier Note: the following two options are only available for ML193UH applications.

2. [Air Filter and Rack Kit for Horizontal Return Air (End) Applications]
3. [Air Filter and Rack Kit for Upflow Side Return Air Applications]

## 2.2 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

## PART 3 - EXECUTION

### 3.1 MANUFACTURER'S INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and [Lennox Industries] SPEC-DATA® sheets.

### 3.2 EXAMINATION

- A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

### 3.3 INSTALLATION

- A. Install [Gas Furnace] in accordance with manufacturer's instructions and regulations of authorities having jurisdiction.

**END OF SECTION**