

Gas - Fired Pressurized Low Intensity Infrared Heaters



Series TLP

Modine's TLP Series sets the industry standard for low intensity infrared heating performance and installation versatility. The comfort and uniform heating provided by the TLP Series are second to none.

Design Summary:

- Pressurized-type tubular infrared heating system
- Burner inputs of 50,000 Btuh through 200,000 Btuh
- Available in Natural or Propane Gas
- Field-conversion kits available
 - Natural gas to propane gas operation
 - High altitude operation
 - Model size conversion
- 20 to 70 foot tube lengths in straight or U-shaped configuration
- 115 V supply, 24 V controls
- Convenient access to all controls from both sides of the burner box casing
- Design certified for indoor or outdoor, vented or unvented systems in commercial and industrial installations
- Stocking-friendly packaging options
 - Burner kits available for converting from any input to any other listed input, fuel, and elevation.
 - Tube kits available for constructing all straight and U-shaped system lengths from only five kits.
- Available Accessories:
 - Chain mounting sets
 - Thermostat
 - Flexible, stainless steel gas connection
 - Pressure regulator
 - Wall and roof combustion air caps
 - Wall and roof vent caps
 - Aluminum reflector extension
 - Aluminized steel elbows



This catalog describes the design and construction features and benefits, typical applications, dimensional data, and tube configurations available for the TLP Series.

Table of Contents

General Unit Applications 2
 Infrared Heating Systems Defined 2
 Advantages of Infrared Heating 2
 Typical Applications 2
 Features and Benefits 3
 General Performance 4
 Utilities 4
 Clearance to Combustibles 4
 Unit Dimensions and Weights 5
 Modine Breeze™ AccuSpec Sizing and Selection Program . 6
 Model Nomenclature 7

Infrared Heating Systems Defined

Infrared heating systems rely upon the transfer of radiant energy from hot heat exchanger surfaces (up to 1000°F for low intensity heaters) through the air to cooler surfaces, without the use of an air mover. Since radiant energy always travels in a straight line from its source, people and objects within a direct line-of-sight of the heat exchanger become warmed immediately.

Infrared heating systems can serve three basic functions:

- Total building heating - The infrared heaters are used to heat the entire building. The system is designed to heat the floor, which, in turn, creates convection currents that heat the air above it.
- Partial building heating - The infrared heaters are used to heat sections of a building such as an assembly line or an office section located in an open area of a warehouse.
- Spot heating - The infrared heaters are used for heating only small areas, such as a loading dock or a single-person work cell. When low-intensity infrared heating is required, usually a U-tube system is specified in order to concentrate the heat.

Advantages of Infrared Heating

- There is no air mover. This reduces electricity and maintenance costs, and also results in better worker comfort, since there are no uncomfortable drafts or annoying fan noise.
- Temperature recovery is quick if cold air is introduced from open doors or windows. A conventional warm air system must first heat the cold air, which then heats the objects in the space. In contrast, an infrared system supplies immediate heat to the surfaces in the space.
- Zone heat control is easy with infrared heating, due to its ability to efficiently heat small areas.
- There can be a significant energy cost savings in spot heating applications. If only a small section of a large, open building requires heat, a conventional warm air system must heat and deliver a large volume of air. This is especially significant in a building with high ceilings, where the warm air will tend to collect. Infrared heaters will more efficiently heat only the surfaces required, at lower thermostat settings.

Example of typical heat distribution in a building:

Infrared heating 40°F 50°F 65°F	Conventional heating 90°F 80°F 70°F
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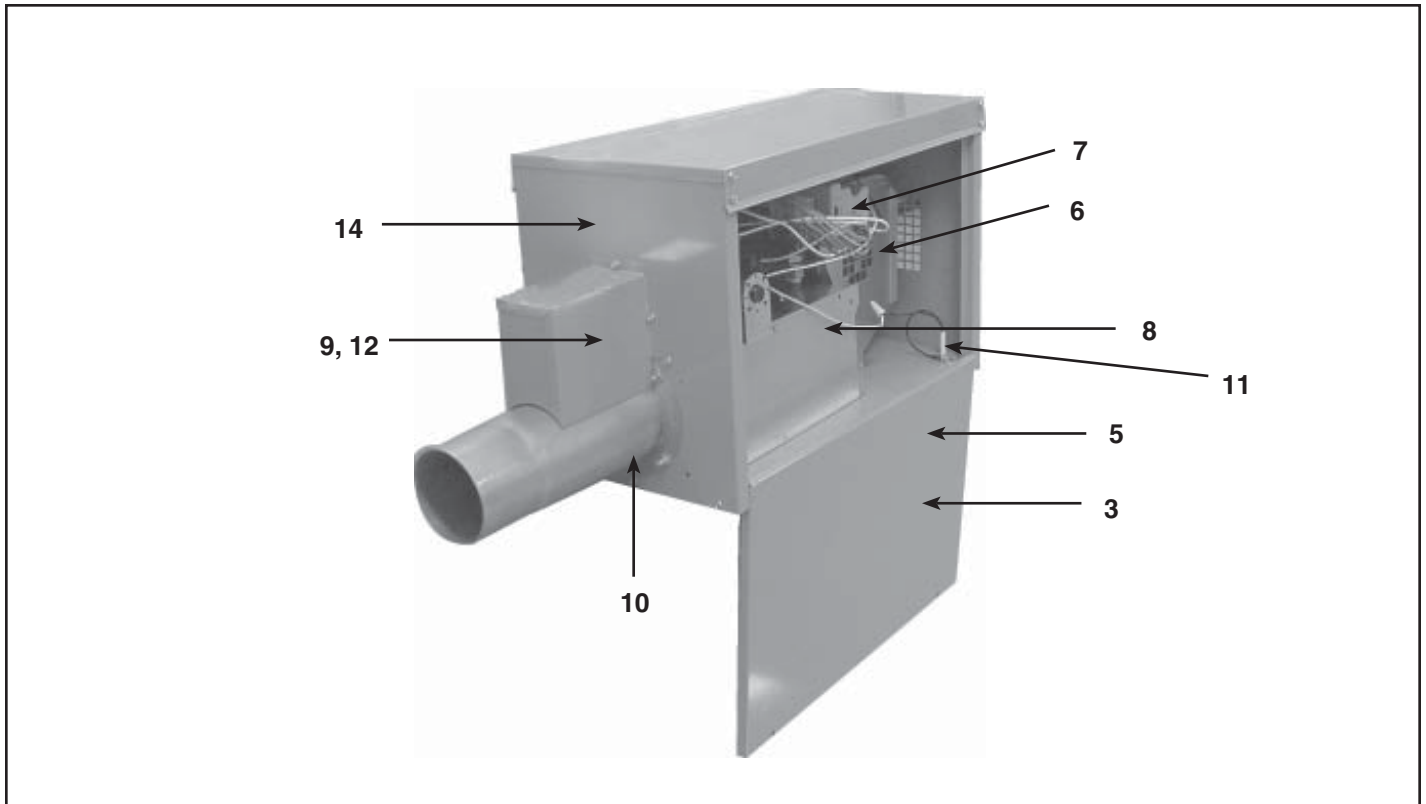
Typical Applications

The following are examples of applications that can benefit from low-intensity infrared heating.

- Manufacturing facilities
- Warehouses and loading docks
- Tennis courts
- Golf driving ranges
- Emergency vehicle garages
- Vestibules
- Vehicle repair centers
- Aircraft hangars
- Car washes
- Covered walkways
- Stadium seating areas

See Infrared Design and Engineering Guide 9-200 for additional application information.

Figure 3.1 - Construction Features



Features

1. Heat-treated aluminized steel tubes
2. Polished aluminum reflectors
3. Sliding/removable side-access panels on both sides of the burner box.
4. Thermal efficiencies of 80%
5. Durable polyester-powder paint
6. Permanently-lubricated combustion blower motor
7. 180 degree-rotating gas valve
8. Sealed burner compartment
9. Flame sensor and ignitor mounted externally to the combustion chamber
10. Flame observation window on underside of combustion chamber
11. Pressure switch closure light on underside of unit
12. Four-trial, hot surface ignition with separate flame sensor
13. System approval for vented, common vented, and unvented installation
14. Weatherproof, water-resistant casing
15. CSA design certification

Benefits

1. Increase both radiant heat and corrosion resistance, for more heat near the end of the heat exchanger and longer heat exchanger life.
2. Direct radiant heat from the tubes to the desired area, for increased comfort over wider areas.
3. Can either be hung from the unit or removed completely while accessing either side of the unit.
4. Maximize fuel savings.
5. Maintains life-long new appearance.
6. Reduces maintenance.
7. Allows convenient access from either side of the burner box.
8. Allows manifold pressure adjustments during unit operation, which increases ease of installation and service.
9. Improve service access.
10. Provides a convenient visual check of unit operation from ground level.
11. Indicates that the combustion blower is operating.
12. Provides reliable ignition.
13. Maximizes installation flexibility.
14. Maximizes application flexibility for both indoor and outdoor installation.
15. Assures that the unit conforms to national safety standards.

**Table 4.1
Performance**

Input MBH	50	60	75	85	100	125	150	175	200
Tube Lengths (ft.)	20, 30	20, 30 40	30, 40 50	30, 40 50	30, 40 50 ②	40, 50 60	50, 60, 70 ③	50, 60 70 ③	50 60, 70 ③
Recommended Mounting Height (ft.) ①	10 – 12	10 – 12	12 – 14	12 – 14	12 – 14	15 – 22	15 – 22	18 – 28	20 - 30

- ① Mounting height values are recommendations for full building heat only and may need to be adjusted to meet requirements of actual installation.
- ② Propane Gas operation at 50 ft. tube system length is not available at this input MBH rating.
- ③ Propane Gas operation at 70 ft. tube system length is not available at this input MBH rating.

Table 4.2 - Utilities

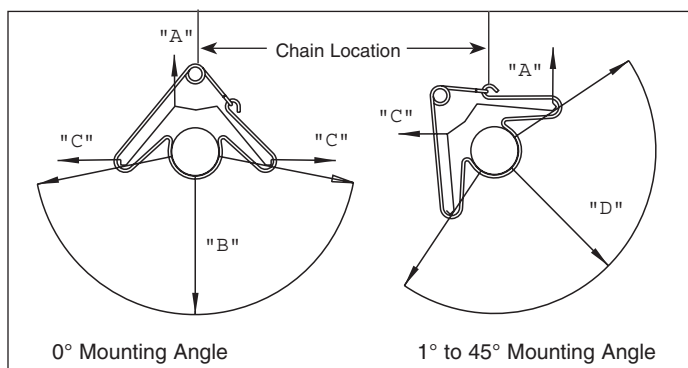
Electrical Rating	Gas Connection (inch)	Minimum Gas Inlet Pressure (" W.C.)	Manifold Gas Pressure (" W.C.)	Flue Connection (inch)	Tube Diameter (inch)
120V/60Hz/1Ph 5.5 AMP	1/2 NPT	5.0 (natural gas) 12.0 (propane gas)	3.5 (natural gas) 10.0 (propane gas)	4 (O.D.)	4 (O.D.)

Table 4.3 - Combustible Material Clearances ①②

Input MBH	Minimum Clearance to Combustible Materials (in.)				Mounting Angle
	Top ("A")	Bottom ("B")	Sides ("C")	Front ("D")	
50	9	54	20	54	0 - 45°
60	9	54	20	54	0 - 45°
75	9	58	20	58	0 - 45°
85	9	66	22	66	0 - 45°
100	9	76	24	76	0 - 45°
125	9	76	24	76	0 - 45°
150	12	106	38	106	0 - 45°
175	12	106	38	106	0 - 45°
200	12	106	38	106	0 - 45°

- ① Clearance to each end and above the U-tube is 12 inches.
- ② In unvented applications, clearance to vent cap is 36"

**Figure 4.1
Combustible Material Clearances**



**Figure 4.2
Stacking Height**

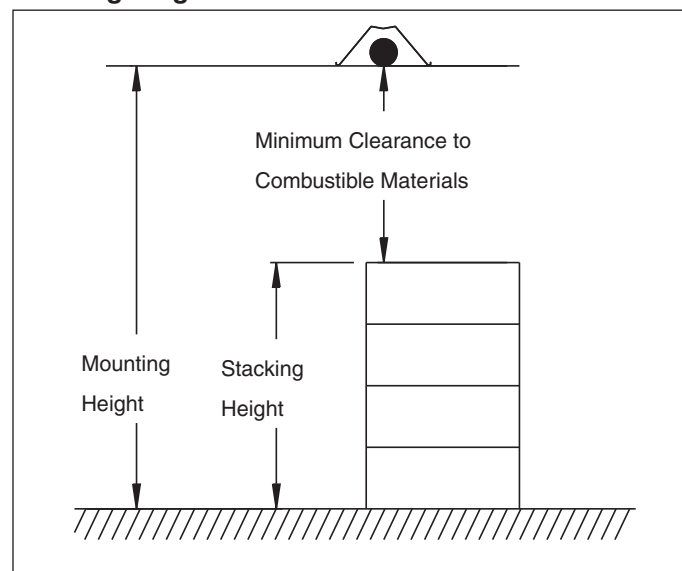


Figure 5.1
Casing Dimensions

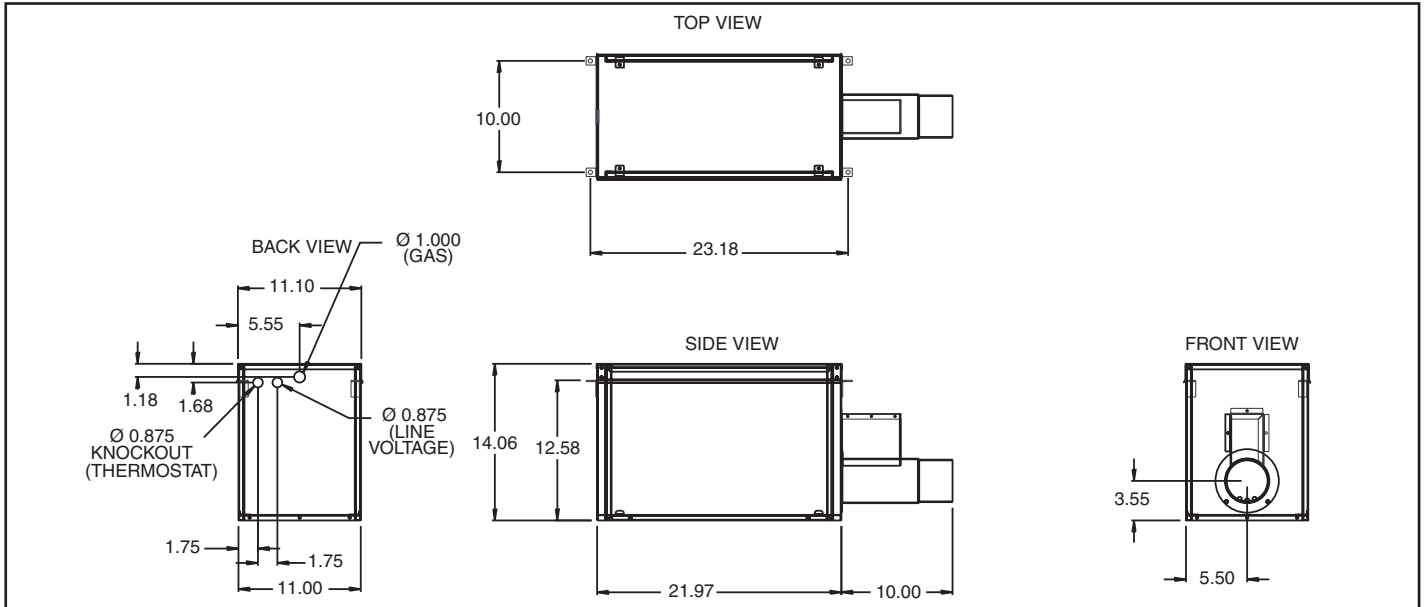


Figure 5.2
Burner and Tube System Dimensions

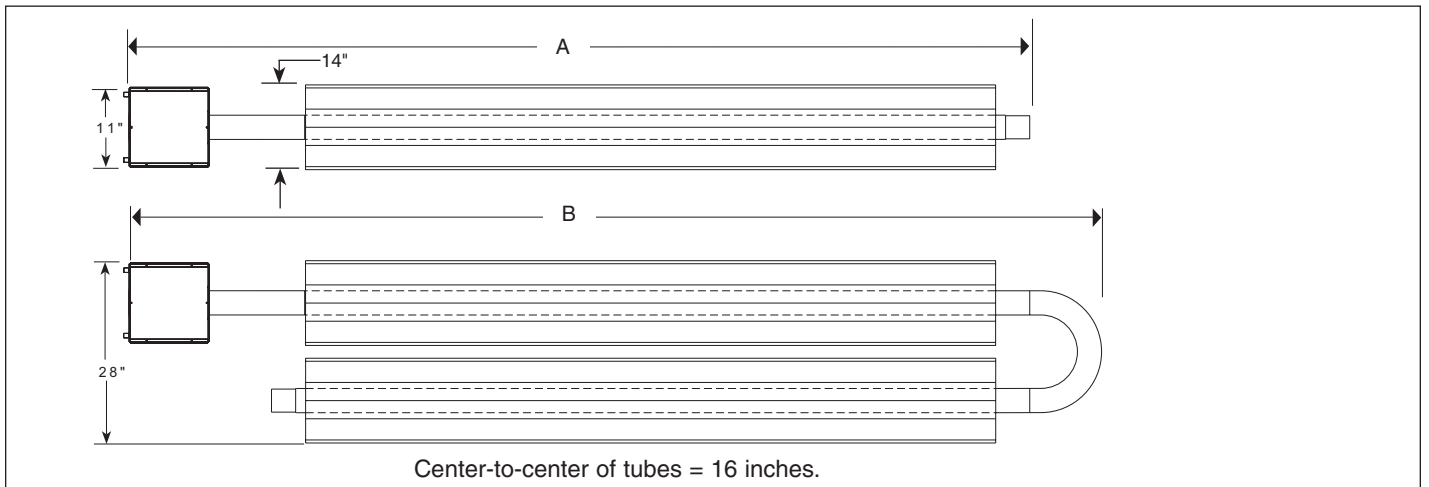


Table 5.1
Tube Systems Data

Tube Length (ft.)	Straight Tube		U-Tube System	
	System Length "A" (ft.)	System Weight (lb.)	System Length "B" (ft.)	System Weight (lb.)
20	23	78	13	89
30	33	112	18	132
40	43	146	23	157
50	53	180	28	200
60	63	214	33	225
70	73	252	38	277

Table 5.2
Burner Shipping Weights

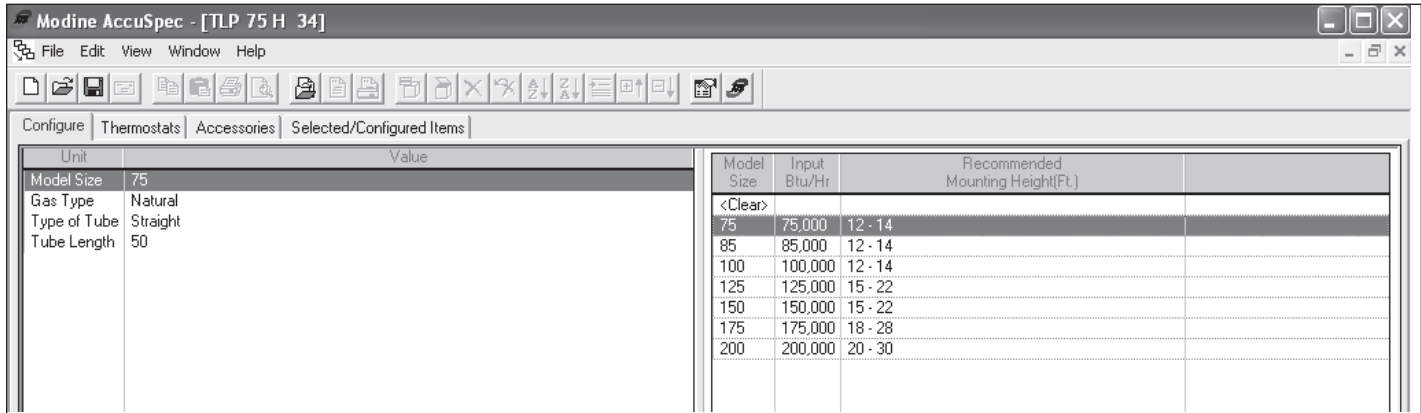
Model	Shipping Wt. (lb.)
All Burners	43



Modine Breeze™ AccuSpec Sizing and Selection Program

The Modine Breeze AccuSpec is the fastest way to generate performance data based on actual job conditions. The Breeze AccuSpec program is a Windows based sizing and selection program. The program provides a series on step-by-step questions that allow for the easy configuration of Modine products. After a model has been configured, the program can generate Submittal Schedules, Submittal Data including performance and dimensional drawings, and Specifications.

Fast and Simple Unit/Thermostat/Accessory Selection



Submittal Schedules

Job Specific Specifications

Unit Specific Dimensional Drawings

SUBMITTAL SCHEDULE

Gas- and Oil-Fired Unit Heaters, Infrared Heaters, and Indoor Ductless Heaters

Job Name:	Date: 11/9/2004
Location:	Engineer:
Submitted by:	Architect:
	Contractor:

Model Number	Unit Tag
TLP 75 H 34	
Quantity of Units	1
Btu/Hr Input	75,000
Btu/Hr Output	
CFM	N/A
Altitude	0-2000
Temperature Rise (degrees F)	N/A
External Static Pressure (E.S.P)	
Total Static Pressure (T.S.P.)	
Gas Type	Natural
Gas Control Type	4 Trial Ignition, 100% Shut-off With Lockout
Supply Voltage	115V/60
Control Voltage	
Motor HP	0.03
Motor RPM	3000
Blower RPM	N/A
Heat Exchanger Type	Aluminized Steel
Options & Accessories (See Attached Pages)	

DIMENSIONS - UNIT

Model TLP Dimensions
Straight Tube

Model Size: TLP75

Dimension	Value
A (in.)	53
Tube Length (ft.)	50
Burner Weight (lbs.)	44
Tube Weight (lbs.)	180
Shipping Weight (lbs.)	43

Clearances to Combustibles (inches)

Location	Clearance (inches)
Top (A)	9
Bottom (B)	28
Side (C)	20
Front (D)	58
End	12

*Clearance to each end and above the U-Tube is 12 inches.

INSTALLATION

furnish and install Modine TLP 75 H 34 low intensity infrared heater(s). The low intensity shall be a Straight Tube configuration. Performance shall be as indicated on the data in the plans. The infrared heater(s) shall be certified for indoor and outdoor use. The infrared heater(s) shall have CSA (Canadian Standards Association) design certification for Canada.

The combustion air blower and burner shall be housed in a water-resistant casing, providing protection from the elements. The burner and control box casing shall be constructed of not less than 16 gauge aluminum. After forming, the casing parts shall be cleaned of all oils and a phosphate conversion coating applied. The phosphatized parts shall then be finished with an electrostatically applied polyester powder paint finish. The applied polyester powder paint shall be baked on all of the exposed casing parts.

The first combustion tubes shall be constructed of 16 gauge, 4" O. D. aluminized steel. The combustion changer tube shall incorporate a turbulator baffle for maximum efficiency of heat transfer.

Reflectors must be used in conjunction with reflectors. The reflector can be adjusted from the burner to the combustion air blower in the horizontal plane. Reflectors shall be of bright polished aluminum.

The infrared heater(s) shall be 115V/60Hz/1ph. Heater(s) shall be equipped with a direct off hot surface ignition control system with a separate flame sensor. Infrared heaters shall be equipped with a 115V/25V control transformer. Thermostat shall operate on 25V. The thermostat shall be equipped with a pre-purge mode, a differential pressure switch, and an indicator light to indicate the combustion air blower. All controls shall be rated for a maximum inlet pressure.

The unit shall be designed for Natural gas having a specific gravity of 0.6, a Btu content of 1040 Btu/m³ at 60°F.

The unit shall be equipped with a single motor. The combustion air blower motor shall be totally enclosed in a motor housing. The motor shall be protected by a thermal overload switch. Motor shall be .03 HP, 115 V, 60 Hz, with an operating speed of 3000 rpm.

General

Contractor shall furnish and install Modine model _____ low intensity infrared heater(s). The low intensity infrared system shall be straight tube _____, U-tube _____ configuration. Performance shall be as indicated on the equipment schedule in the plans. The infrared heater(s) shall be certified for indoor and outdoor installations. Infrared heater(s) shall have CSA (Canadian Standards Association) design certification for use in both the US and Canada.

Casing

The controls, combustion air blower and burner shall be housed in a water-resistant casing, providing weatherproof protection. The burner and control box casing shall be constructed of not less than 20 gauge aluminized steel. After forming, the casing parts shall be cleaned of all oils and a phosphate coating applied prior to painting. The phosphated parts shall then be finished with an electrostatically applied, gray-green polyester powder paint finish. The applied polyester powder paint shall be baked on to provide an attractive finish on all of the exposed casing parts.

Heat Exchanger

The heat exchanger tubes and combustion chamber shall be constructed of 16 gauge, 4" O. D. aluminized steel, and the first combustion tube for gas inputs 150,000 Btu/h and greater shall be 16 gauge 4" O. D. titanium aluminized steel. The last heat exchanger tube shall incorporate a turbulator baffle for maximum efficiency of heat transfer.

The heat exchanger tubes must be used in conjunction with reflectors. The reflector can be adjusted from 0° to 45° from the horizontal plane. Reflectors shall be of bright polished aluminum.

Controls

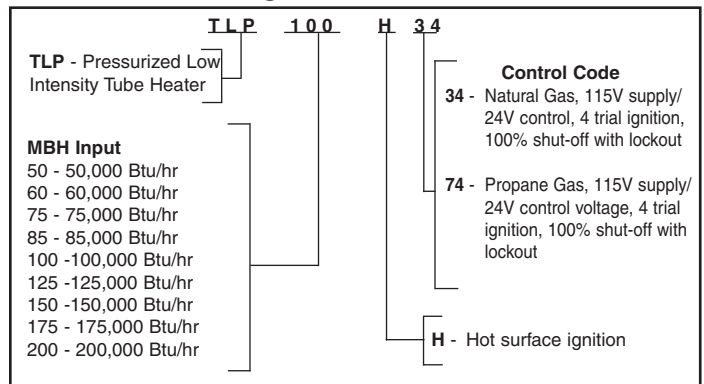
Input power to the infrared heater(s) shall be 115V/60Hz/1ph. Heater(s) shall be equipped with a direct four-trial (three re-trial), 100% shut-off hot surface ignition control system with a separate flame sensor. Infrared heater(s) shall be equipped with a 115V/25V control transformer. Thermostat shall operate on 25V. Heater(s) will be equipped with a pre-purge mode, a differential pressure switch, and an indicator light to prove proper operation of the combustion air blower. All controls shall be rated for a maximum inlet pressure of 1/2 PSI gas pressure.

Controls shall be designed for natural _____, propane _____ gas having a specific gravity of _____, a Btu content of _____ Btu/ft³ at _____ feet elevation.

Motor

Each heater shall have a single motor. The combustion air blower motor shall be totally enclosed in the control box and the motor shall be protected by a thermal overload switch. The motor shall be .03 H.P., 115 volt, 60 Hz, single phase, with an operating speed of 3000 rpm.

Figure 7.1
Model Number Designations



INDOOR AIR SOLUTIONS

The Modine brand has been the industry standard since Arthur B. Modine invented and patented the first lightweight, suspended hydronic unit heater in 1923. No other manufacturer can provide the combined application flexibility, technical expertise and fast delivery found at Modine. Consult your local Modine distributor for help in solving your indoor air problems.

Products from Modine are designed to provide indoor air-comfort solutions for commercial, institutional and industrial applications. Whatever your heating, ventilating and cooling requirements, Modine has the product to satisfy your needs, including:

- Gas-fired unit heaters
- Gas-fired duct furnaces
- Gas-fired high-intensity infrared heaters
- Gas-fired low-intensity infrared heaters
- Steam/hot water unit heaters
- Steam/hot water cabinet unit heaters
- Steam/hot water commercial fin tube radiation
- Oil-fired unit heaters
- Electric unit heaters
- Indoor gravity vented single and multiple duct furnace make-up air units
- Indoor separated combustion single and multiple duct furnace make-up air units
- Outdoor single and multiple duct furnace make-up air units
- Direct-fired make-up air units

With burner capacities up to 7,862,000 Btu/hr and air-handling capacities as high as 60,000 CFM, Modine products are compatible with every fuel type, including:

- **Natural or Propane Gas • Steam/Hot Water • Oil • Electric**

Specific catalogs and computer-generated heat-loss calculations are available for each product. Catalogs 75-136 and 75-137 provide details on all Modine HVAC equipment.

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