

## **THERMAL OIL HEATER**

HC-120 is a 1,200,000 Btu/hr output helical coil thermal fluid heater, with manifold, for the addition of auxiliary pumps.

The input to the burner is 1,411,765 Btu/hour. The usable output is 1,200,000 Btu/hour. The heater operates at a thermal efficiency of 85 percent.

The heater has a 3-port manifold, which permits use of 3 independent hot oil circuits with auxiliary pumps.

### **BURNER**

The heater uses a fully modulating, propane or combination burner that fires on natural gas and No. 2 oil. The burner pilot requires natural gas or propane for ignition.

### **CIRCULATING PUMP AND MOTOR**

The pump maintains constant circulation of thermal fluid through the helical coil and manifold. (Auxiliary pumps, which are not included, circulate the thermal fluid through the independent hot oil circuits.) The circulating pump provides a flow of 100 gpm at 70 psi. It is powered by a 460-volt, 3-phase current, 10 hp TEFC electric motor, which operates at 3600 rpm. The pump and motor are bolted to a mounting base that is welded to the heater skid. A guard covers the coupling between the motor and pump.

### **DIGITAL DIFFERENTIAL PRESSURE SWITCH**

A digital differential pressure switch senses the pressure at the inlet and at the outlet of the helical coil.

### **EXPANSION TANK**

The expansion tank has a capacity of 175 gallons and is pre-installed atop the heater shell. It incorporates a low-media-level switch and float. A sight gauge, which includes shutoff valves, is mounted on one end of the tank

### **CONTROLS**

The electrical control panel is a NEMA 4 panel, which protects against windblown dust and rain, splashing water, and hose-directed water. It is UL listed.

The heater automatically maintains the operating temperature set by the operator. The controls maintain the thermal fluid at the heater's outlet up to 450° F, (depending on options). The heater has numerous safety features to ensure that the heater always operates within prescribed limits.

### **FACTORY TESTING**

We test the heater at our factory before delivery to the purchaser.

OPTION:

Centrifugal hot oil pump is provided to maintain a 100 gpm flow rate through the system. This auxiliary side pump includes a 7 ½ hp TEFC, 3500 rpm, 460 volt motor and coupling guard mounted on a steel skid base.

OPTION:

Silo pump check valve and bypass piping.

**From:** [Mark Simmons](#)  
**To:** [Lynne Santos](#)  
**Subject:** FW: Low Nox Heater information  
**Date:** Friday, July 2, 2021 8:06:27 AM  
**Attachments:** [image003.png](#)

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Lynne,

Please see the below. If you have any questions, please let me know.

Happy 4<sup>th</sup>.

Mark

HC-200 - 12.375" inside diameter, 25.9 ft/s on NG, 20.2 ft/s on #2

<b>Combustion Data</b>	<b>OIL FIRED</b>						<b>GAS FIRED</b>					
	0%	20%	40%	60%	80%	100%	0%	20%	40%	60%	80%	100%
%O <sub>2</sub>							10.1	10.2	10.1	9.2	9.2	8.9
%CO <sub>2</sub>				*			6	6.05	6.1	6.6	6.7	6.8
CO(PPM)												
NOx(PPM)							2	2	2	3	3	3

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# NovaStar

Ultra Low NOx Burner for Aggregate Drying

NS-1  
Edition 3-13



- Ultra low NOx emissions of that meet most stringent air quality standards without FGR or water injection on natural gas and vaporized propane
- Precise air flow control via VFD and low horsepower design offers significant energy savings
- Compact modular design suitable for stationary or portable plants
- Standard and long-nose variations available to suit all drum types
- Advanced construction for ease of installation and maintenance
- Sealed-in design for ultra quiet operation and maximum fuel efficiency

\* For California Markets

*Emissions less than 4.3 ppm NOx and 42 ppm CO (19% O<sub>2</sub>)  
compliant with San Joaquin Air Quality District standards, Rule 4309*

*Emissions less than 36 ppm NOx and 400 ppm CO (3% O<sub>2</sub>)  
compliant with South Coast Air Quality District standards*

Utilizing the latest patented lean burn premix technologies, the NovaStar offers design and performance advantages with service accessibility and ease of installation.

Available in various sizes the NovaStar is ready to meet your production needs and even the most stringent air quality standards with ultra low nitrogen oxide (NOx) emissions on gaseous fuels without the added expense of flue gas recirculation (FGR) technology. (For California markets, see notation on page 1.)

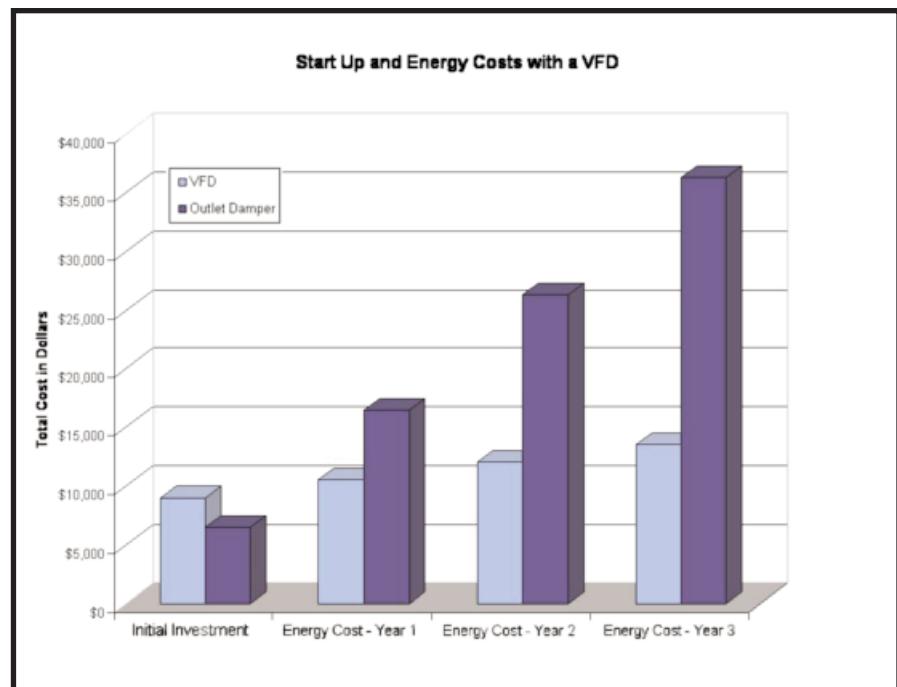
The NovaStar employs variable frequency drive (VFD) technology for precise air flow control over its entire operating range. Combining precise air flow control with real time fuel flow measurement results in maximum efficiency and cost savings. The use of this VFD technology offers energy savings via reduced electricity consumption as illustrated in the adjoining chart.

The burner can be easily operated and effectively managed with PLC-based control provided by Hauck's BCS products.

The burner produces a compact flame making it suitable for all drum sizes and types. This further reduces emissions by completing all combustion within the short combustion zone eliminating flame quenching from process materials.



NovaStar NS150 firing natural gas at 140 MMBtu/hr



Savings based on 2000 hour season at 14 cents per kWh with variable duty cycle times.

For additional information on this product, visit our website at:

[www.hauckburner.com](http://www.hauckburner.com)

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Eclipse, Inc.  
1665 Elmwood Road  
Rockford, IL 61103  
USA

January 1, 2016

T +1 815.877.3031

Eclipse, Inc. makes the following statements of estimated emissions levels for the products of combustion from the Hauck NovaStar series burners.

Emissions are based on adequate flame volume, i.e. the burner flame path shall be unobstructed and shall be equal to or greater than the predicted flame diameter and length including a clean combustion zone with no material veiling through the flame; no contaminants in the aggregate such as blasting, fertilizer, or any organic nitrogen containing compounds, and no contaminants in the process beyond our control.

The drum must be properly maintained to not allow excessive air infiltration. Combustion air shall be supplied at ambient temperature.

The fuel shall be free of fuel-bound nitrogen unless otherwise specified; NOx emissions may exceed those listed if the fuel contains substantial amounts fuel bound nitrogen. It must be recognized that test results in general, and NOx levels in particular, are difficult to obtain accurately and are always subject to error.

SOx emissions are based on a maximum 50% fuel-bound sulfur conversion efficiency with the remainder 50% assumed contained in the final product.

The emission levels in pounds per ton of aggregate are based on an input of 250,000 BTU/ton. All emission levels are for minimum 50% burner output (as percentage of maximum burner catalog rating) or higher. Emission levels may exceed those shown at lower firing rates.

Regards,

Ben Gatto  
Engineering Manager, Hauck

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## HAUCK NOVASTAR EMISSIONS ESTIMATES

### Natural Gas Fired NovaStar Emissions:

NOx	$\leq 30$ ppm corrected to 3% O <sub>2</sub> dry	0.009 lbs/ton of aggregate
CO	$\leq 395$ ppm corrected to 3% O <sub>2</sub> dry	0.082 lbs/ton of aggregate
VOC	$\leq 105$ ppm corrected to 3% O <sub>2</sub> dry	0.030 lbs/ton of aggregate (VOC Weight based on C <sub>3</sub> H <sub>8</sub> )
SOx	None	No Sulfur in Fuel

### Vaporous Propane Gas Fired NovaStar Emissions:

NOx	$\leq 30$ ppm corrected to 3% O <sub>2</sub> dry	0.009 lbs/ton of aggregate
CO	$\leq 395$ ppm corrected to 3% O <sub>2</sub> dry	0.085 lbs/ton of aggregate
VOC	$\leq 105$ ppm corrected to 3% O <sub>2</sub> dry	0.031 lbs/ton of aggregate (VOC Weight based on C <sub>3</sub> H <sub>8</sub> )
SOx	None	No Sulfur in Fuel



## CAPACITIES

### NOVASTAR NS-75 – NS-100

NovaStar-75 (Natural Gas)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Natural Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
LOW FIRE	16	18	252,000	0.6	17,300	2.7	5	4
	20	22	315,000	1.2	21,600	3.8	5	4
	25	27	386,000	1.9	26,400	6.6	6	3
	30	33	468,000	2.8	32,000	8.5	7	4
	40	45	630,000	4.9	43,100	16.2	8	4
	50	55	783,000	7.8	53,600	23.7	9	4
HIGH FIRE	60	70	985,000	11.1	67,400	38.4	9	4

NovaStar-75 (Gaseous Propane)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Propane Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
LOW FIRE	16	18	252,000	0.6	7,200	1.2	5	4
	20	22	315,000	1.2	8,800	1.6	5	4
	25	27	386,000	1.9	10,800	2.8	6	3
	30	33	468,000	2.8	13,200	3.7	7	4
	40	45	630,000	4.9	18,000	7.3	8	4
	50	55	783,000	7.8	22,000	10.3	9	4
HIGH FIRE	60	70	985,000	11.1	28,000	17.1	9	4

#### NOTES:

1. Capacities based on Natural Gas with a higher heating value of 1,042 BTU/ft<sup>3</sup>, 0.59 S.G., and a stoichiometric air to fuel ratio of 9.74:1 and Gaseous Propane with a higher heating value of 2,500 BTU/ft<sup>3</sup>, 1.52 S.G., and a stoichiometric air to fuel ratio of 23.8:1
2. Air and gas flows are based on 60°F @ sea level.
3. Burner air and gas pressures are measured upstream of the mixing assembly.
4. Capacities listed above are for 50% excess air. Capacities and excess air are typically adjusted on site to achieve optimal emissions per application.
5. Burners are suitable for use on other clean industrial gaseous fuels, such as gaseous propane, for more information please consult Hauck.

See Reverse Side for NS100 Capacities.

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

**HAUCK MANUFACTURING CO., P.O. Box 90 Lebanon, PA 17042-0090 717-272-3051**

## CAPACITIES

NovaStar-100 (Natural Gas)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Natural Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
<b>LOW FIRE</b>	16	27	374,000	0.7	26,000	3.0	5	3
	20	33	470,000	1.2	32,000	6.6	4	4
	25	40	575,000	1.8	39,000	9.7	4	4
	30	49	680,000	2.7	47,000	14.2	5	4
	40	63	890,000	4.4	61,000	23.3	6	5
	50	85	1,200,000	8.1	82,000	37.7	7	5
<b>HIGH FIRE</b>	60	100	1,410,000	11.1	97,000	48.5	10	6

NovaStar-100 (Gaseous Propane)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Propane Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
<b>LOW FIRE</b>	16	27	374,000	0.7	10,800	1.3	5	3
	20	33	470,000	1.2	13,200	2.9	4	4
	25	40	575,000	1.8	16,000	4.2	4	4
	30	49	680,000	2.7	19,600	6.4	5	4
	40	63	890,000	4.4	25,200	10.2	6	5
	50	85	1,200,000	8.1	34,000	16.7	7	5
<b>HIGH FIRE</b>	60	100	1,410,000	11.1	40,000	21.2	10	6

### NOTES:

1. Capacities based on Natural Gas with a higher heating value of 1,042 BTU/ft<sup>3</sup>, 0.59 S.G., and a stoichiometric air to fuel ratio of 9.74:1 and Gaseous Propane with a higher heating value of 2,500 BTU/ft<sup>3</sup>, 1.52 S.G., and a stoichiometric air to fuel ratio of 23.8:1
2. Air and gas flows are based on 60°F @ sea level.
3. Burner air and gas pressures are measured upstream of the mixing assembly.
4. Capacities listed above are for 50% excess air. Capacities and excess air are typically adjusted on site to achieve optimal emissions per application.
5. Burners are suitable for use on other clean industrial gaseous fuels, such as gaseous propane, for more information please consult Hauck.



## CAPACITIES

### NOVASTAR NS-125 – NS-150

NovaStar-125 (Natural Gas)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Natural Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
<b>LOW FIRE</b>	16	34	475,000	0.6	33,000	3.1	4	3
	20	42	605,000	1.0	41,000	7.6	5	3
	25	53	750,000	1.5	51,000	11.7	5	3
	30	64	910,000	2.1	62,000	17.3	6	4
	40	87	1,220,000	3.8	84,000	31.9	7	4
	50	111	1,560,000	5.5	107,000	49.1	8	5
<b>HIGH FIRE</b>	60	129	1,820,000	8.0	125,000	74.1	10	5

NovaStar-125 (Gaseous Propane)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Propane Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
<b>LOW FIRE</b>	16	34	475,000	0.6	13,600	1.4	4	3
	20	42	605,000	1.0	16,800	3.3	5	3
	25	53	750,000	1.5	21,200	5.2	5	3
	30	64	910,000	2.1	25,600	7.6	6	4
	40	87	1,220,000	3.8	34,800	14.1	7	4
	50	111	1,560,000	5.5	44,400	21.8	8	5
<b>HIGH FIRE</b>	60	129	1,820,000	8.0	51,600	32.5	10	5

#### NOTES:

1. Capacities based on Natural Gas with a higher heating value of 1,042 BTU/ft<sup>3</sup>, 0.59 S.G., and a stoichiometric air to fuel ratio of 9.74:1 and Gaseous Propane with a higher heating value of 2,500 BTU/ft<sup>3</sup>, 1.52 S.G., and a stoichiometric air to fuel ratio of 23.8:1
2. Air and gas flows are based on 60°F @ sea level.
3. Burner air and gas pressures are measured upstream of the mixing assembly.
4. Capacities listed above are for 50% excess air. Capacities and excess air are typically adjusted on site to achieve optimal emissions per application.
5. Burners are suitable for use on other clean industrial gaseous fuels, such as gaseous propane, for more information please consult Hauck.

See Reverse Side for NS150 Capacities.

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

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## CAPACITIES

NovaStar-150 (Natural Gas)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Natural Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
<b>LOW FIRE</b>	16	42	596,980	0.7	40,861	4.9	6	3
	20	53	743,370	1.2	50,881	8.7	6	4
	25	60	845,420	1.8	57,866	11.8	6	5
	30	75	1,065,700	2.5	72,943	19.0	8	5
	40	106	1,499,510	4.6	102,636	36.5	9	5
	50	131	1,855,090	7.0	126,975	55.1	10	6
<b>HIGH FIRE</b>	60	150	2,126,150	9.9	145,530	76.5	15	6

NovaStar-150 (Gaseous Propane)								
Output			Combustion Air Flow (SCFH)	Burner Air Pressure (in.w.c.)	Propane Gas Flow (SCFH)	Burner Gas Pressure (in.w.c.)	Flame	
	VFD (Hz)	Burner (MMBTU/h)					Length (ft)	Diameter (ft)
<b>LOW FIRE</b>	16	42	596,980	0.7	16,800	2.1	6	3
	20	53	743,370	1.2	21,200	3.9	6	4
	25	60	845,420	1.8	24,000	5.2	6	5
	30	75	1,065,700	2.5	30,000	8.3	8	5
	40	106	1,499,510	4.6	42,400	16.0	9	5
	50	131	1,855,090	7.0	52,400	24.2	10	6
<b>HIGH FIRE</b>	60	150	2,126,150	9.9	60,000	33.5	15	6

### NOTES:

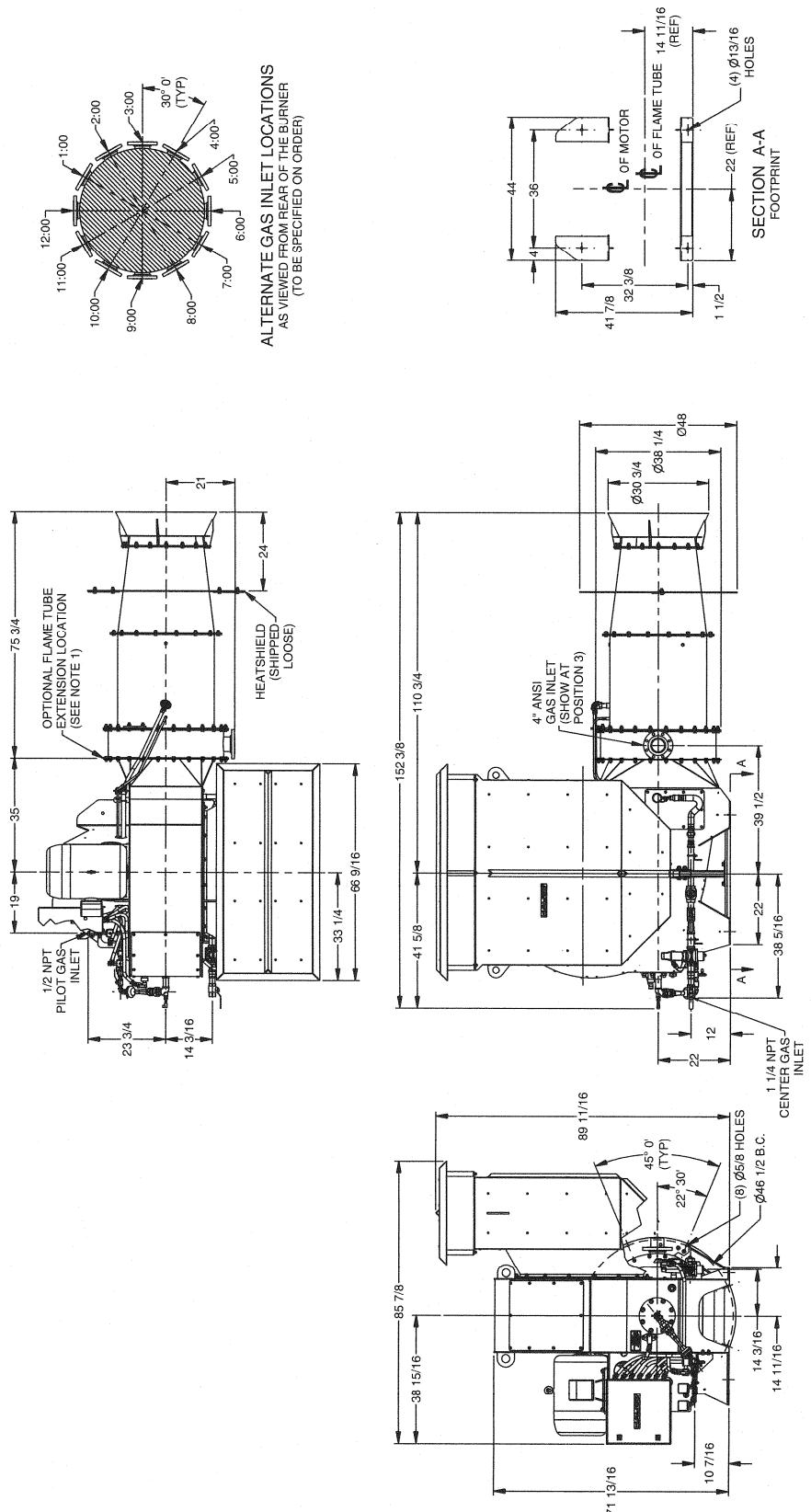
1. Capacities based on Natural Gas with a higher heating value of 1,042 BTU/ft<sup>3</sup>, 0.59 S.G., and a stoichiometric air to fuel ratio of 9.74:1 and Gaseous Propane with a higher heating value of 2,500 BTU/ft<sup>3</sup>, 1.52 S.G., and a stoichiometric air to fuel ratio of 23.8:1
2. Air and gas flows are based on 60°F @ sea level.
3. Burner air and gas pressures are measured upstream of the mixing assembly.
4. Capacities listed above are for 50% excess air. Capacities and excess air are typically adjusted on site to achieve optimal emissions per application.
5. Burners are suitable for use on other clean industrial gaseous fuels, such as gaseous propane, for more information please consult Hauck.



## DIMENSIONS

### NOVASTAR

#### NOVASTAR-75



#### NOTES:

1. LONG NOSE BURNERS TO BE EXTENDED BETWEEN THE BURNER AIR HOUSING AND THE GAS MANIFOLD AS INDICATED IN THE TOP VIEW. BURNER EXTENSIONS TO BE SPECIFIED ON ORDER IN 1 FOOT INCREMENTS.
2. APPROXIMATE BURNER WEIGHT WITH TEFC MOTOR = 3200LB APPROXIMATE ATTENUATOR WEIGHT = 700 LB

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

**HAUCK MANUFACTURING CO., P.O. Box 90 Lebanon, PA 17042-0090 717-272-3051**

12/11

[www.hauckburner.com](http://www.hauckburner.com)

Fax: 717-273-9882

**NS-3**

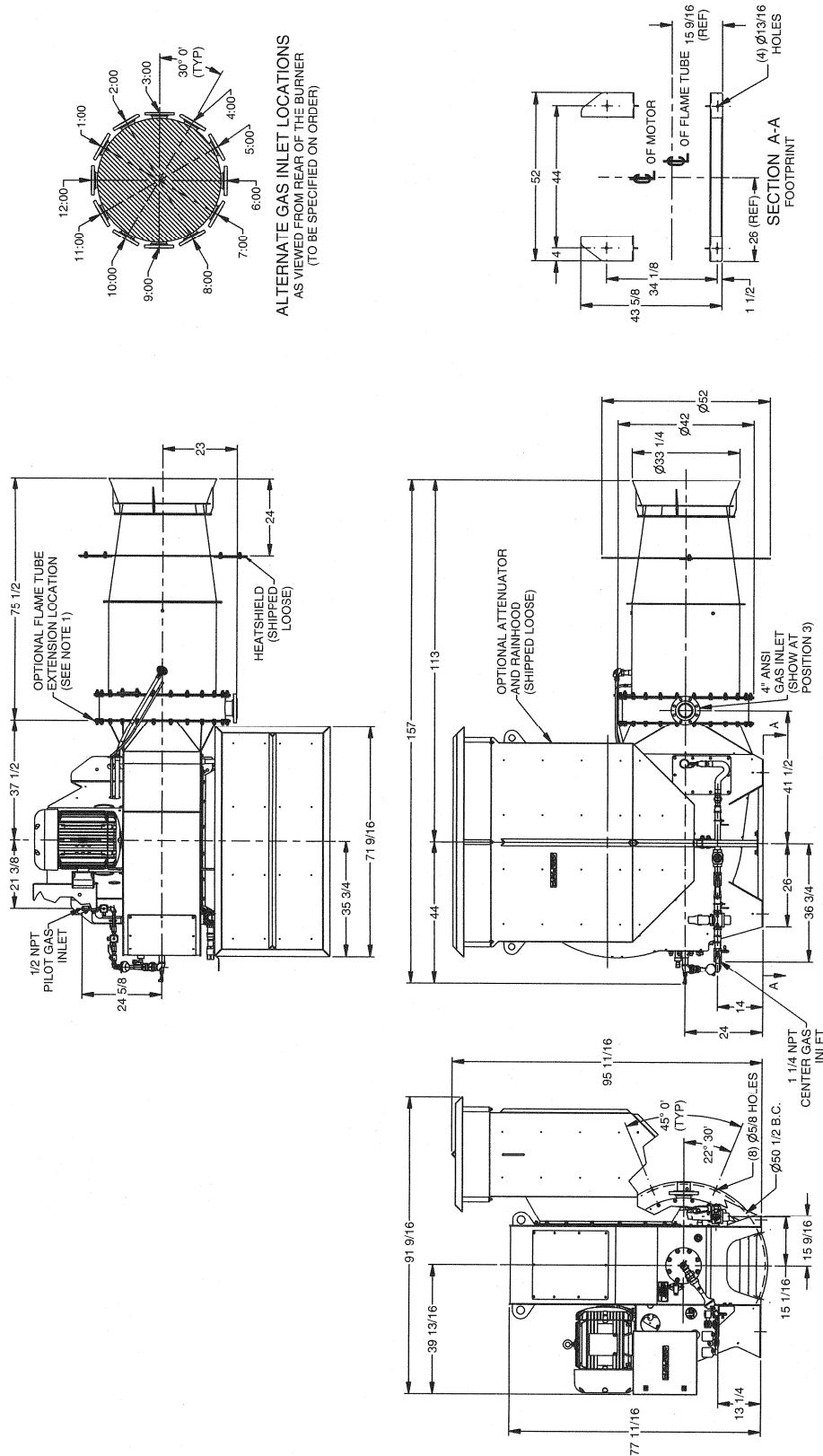
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(NOT TO SCALE)



NOVASTAR-100

**NOVASTAR**

## DIMENSIONS



#### NOTES:

1. LONG NOSE BURNERS TO BE EXTENDED BETWEEN THE BURNER AIR HOUSING AND THE GAS MANIFOLD AS INDICATED IN THE TOP VIEW. BURNER EXTENSIONS TO BE SPECIFIED ON ORDER IN 1 FOOT INCREMENTS.
2. APPROXIMATE BURNER WEIGHT WITH TEFC MOTOR = 3600 LB APPROXIMATE ATTENUATOR WEIGHT = 750 LB

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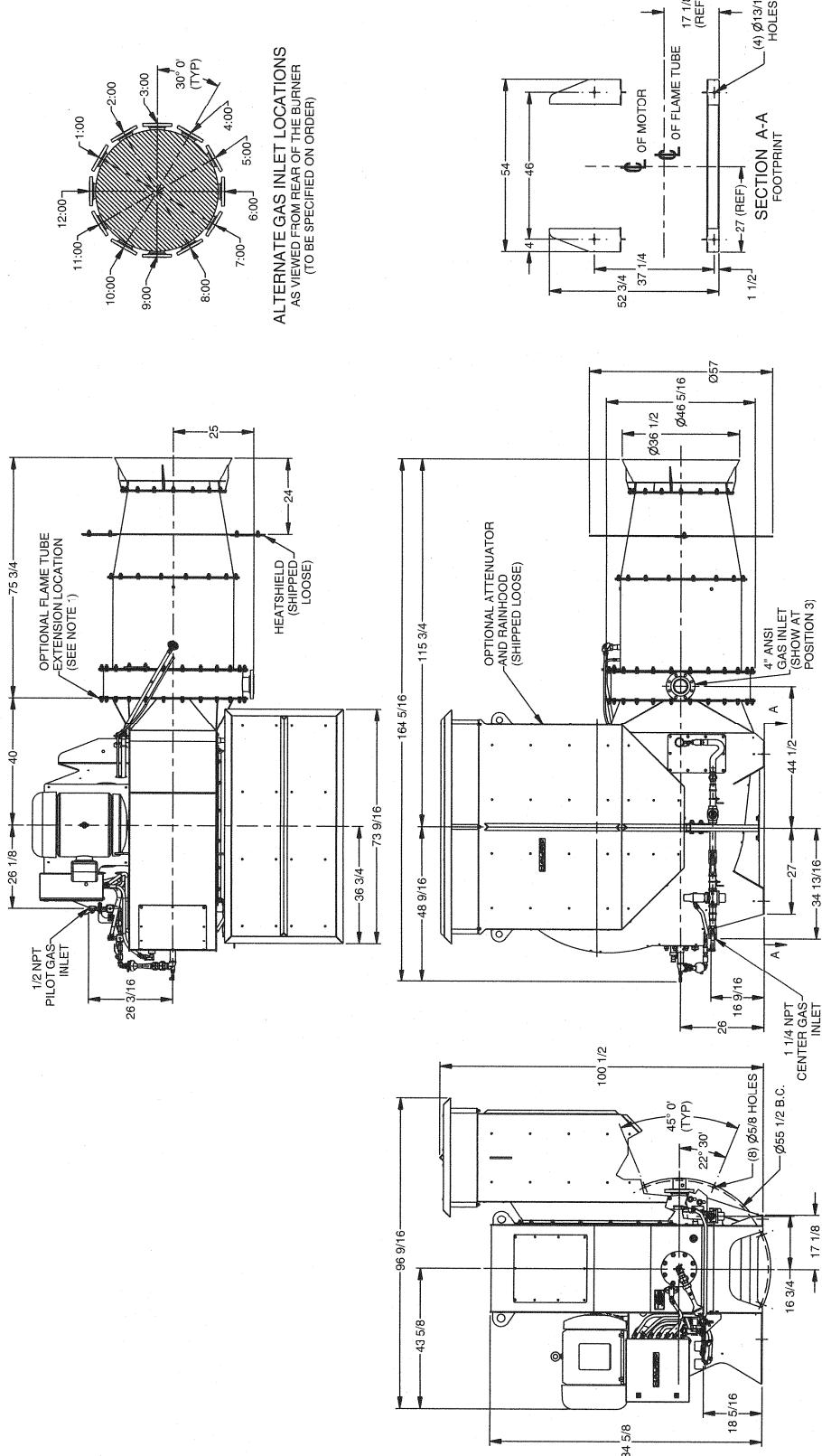
NS-3.1



## DIMENSIONS

### NOVASTAR

#### NOVASTAR 125



#### NOTES:

1. LONG NOSE BURNERS TO BE EXTENDED BETWEEN THE BURNER AIR HOUSING AND THE GAS MANIFOLD AS INDICATED IN THE TOP VIEW. BURNER EXTENSIONS TO BE SPECIFIED ON ORDER IN 1 FOOT INCREMENTS.

2. APPROXIMATE BURNER WEIGHT WITH TEFC MOTOR = 4300 LB APPROXIMATE ATTENUATOR WEIGHT = 800 LB

Y8360  
(NOT TO SCALE)

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

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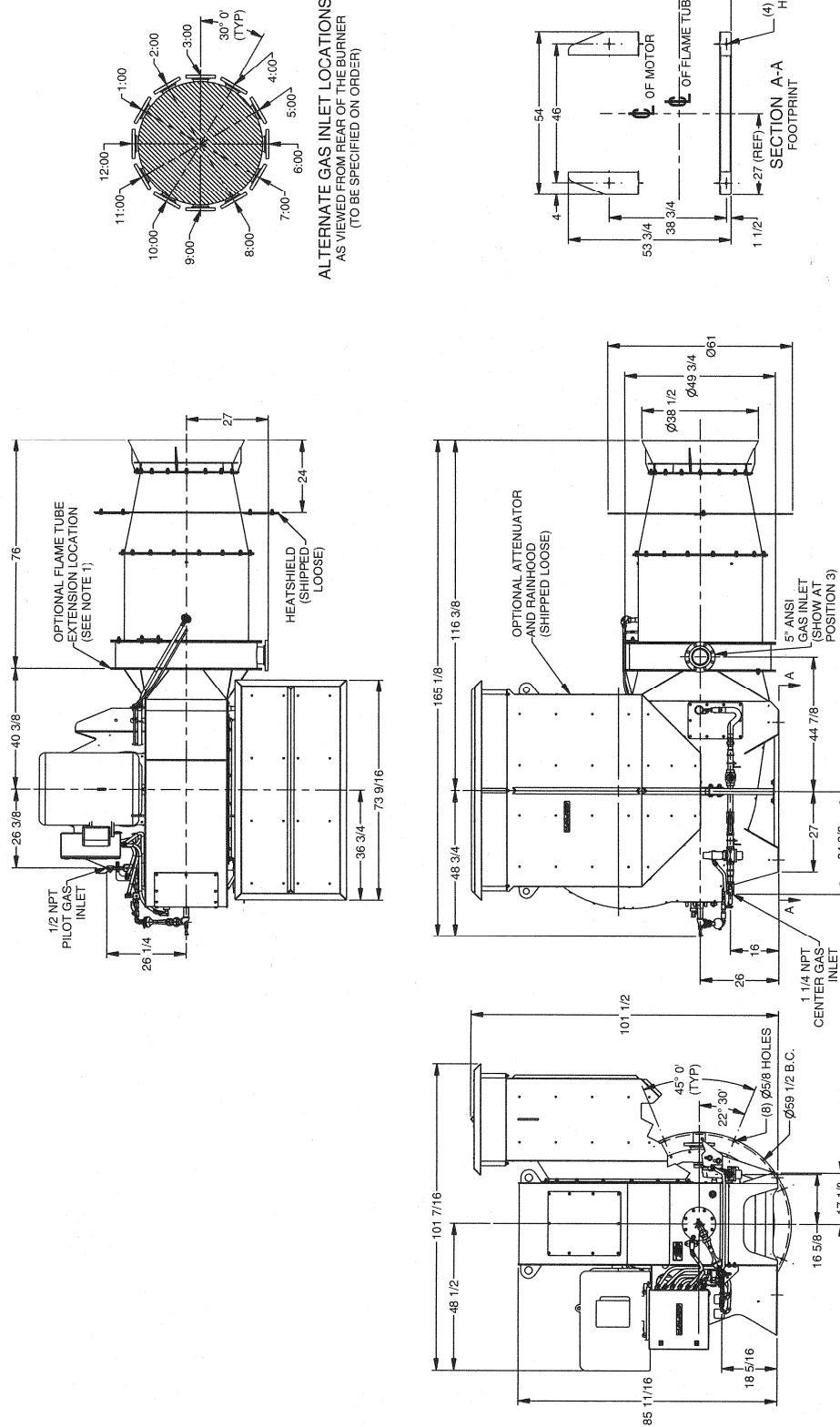
**NS-3.2**



## DIMENSIONS

### NOVASTAR

#### NOVASTAR 150



#### NOTES:

1. LONG NOSE BURNERS TO BE EXTENDED BETWEEN THE BURNER AIR HOUSING AND THE GAS MANIFOLD AS INDICATED IN THE TOP VIEW. BURNER EXTENSIONS TO BE SPECIFIED ON ORDER IN 1 FOOT INCREMENTS.
2. APPROXIMATE BURNER WEIGHT WITH TEFC MOTOR = 5000 LB  
APPROXIMATE ATTENUATOR WEIGHT = 800 LB

In accordance with Hauck's commitment to Total Quality Improvement, Hauck reserves the right to change the specifications of products without prior notice.

**HAUCK MANUFACTURING CO., P.O. Box 90 Lebanon, PA 17042-0090 717-272-3051**

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**NS-3.3**