

**ACL**

Manufacturing Inc.

**ACL HIGH EFFICIENCY BURNER ASSEMBLY**

# **ACL HIGH EFFICIENCY BURNER ASSEMBLY**

**PATENTED BURNER**

## **WARNING**

**This manual must be read in its entirety before installation of this burner. Installation must be performed by a qualified technician and must adhere to the standards set by the local regulatory authorities.**

**ACL is not responsible for the misuse or incorrect application of this product.**

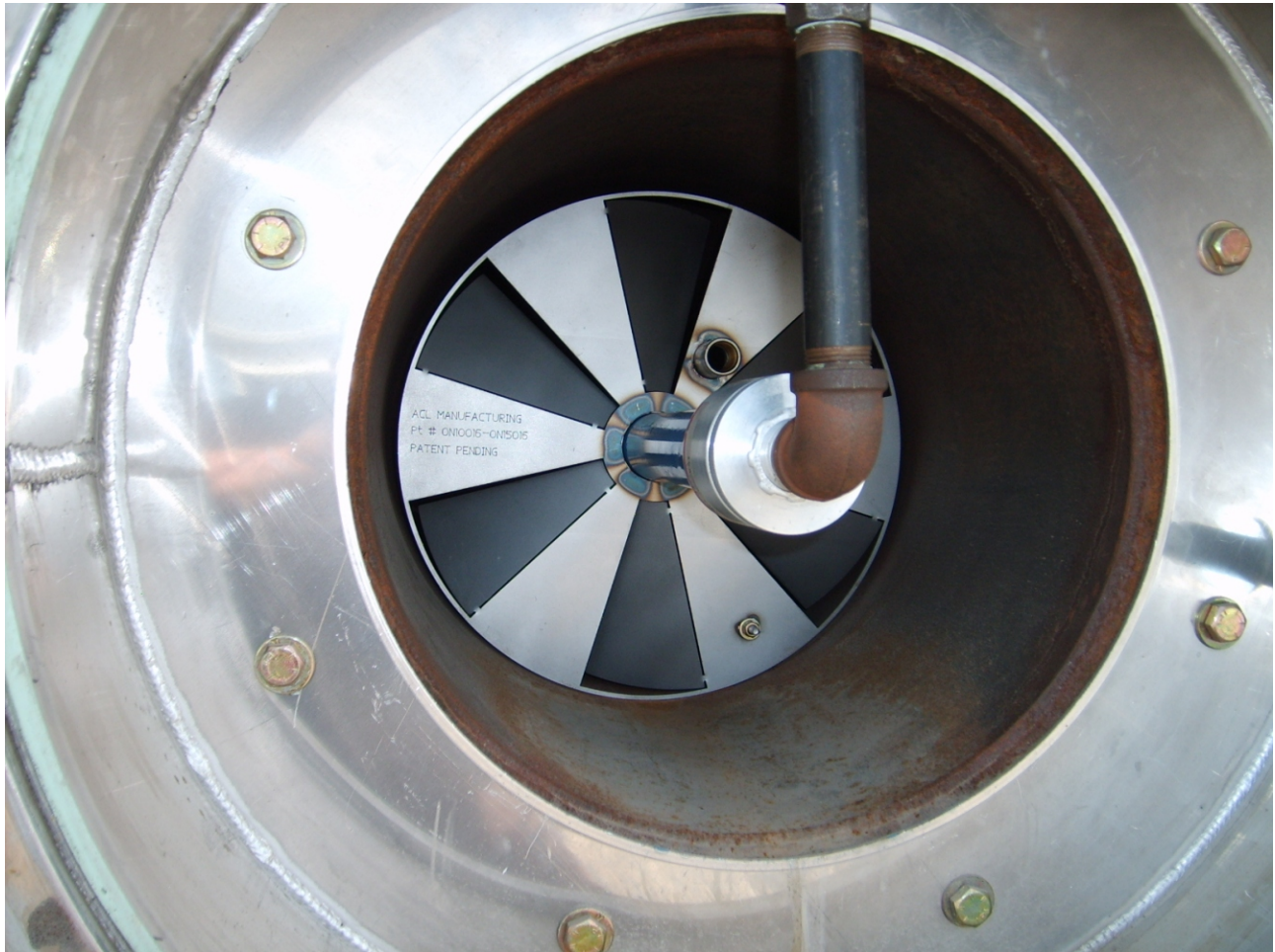
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## Application

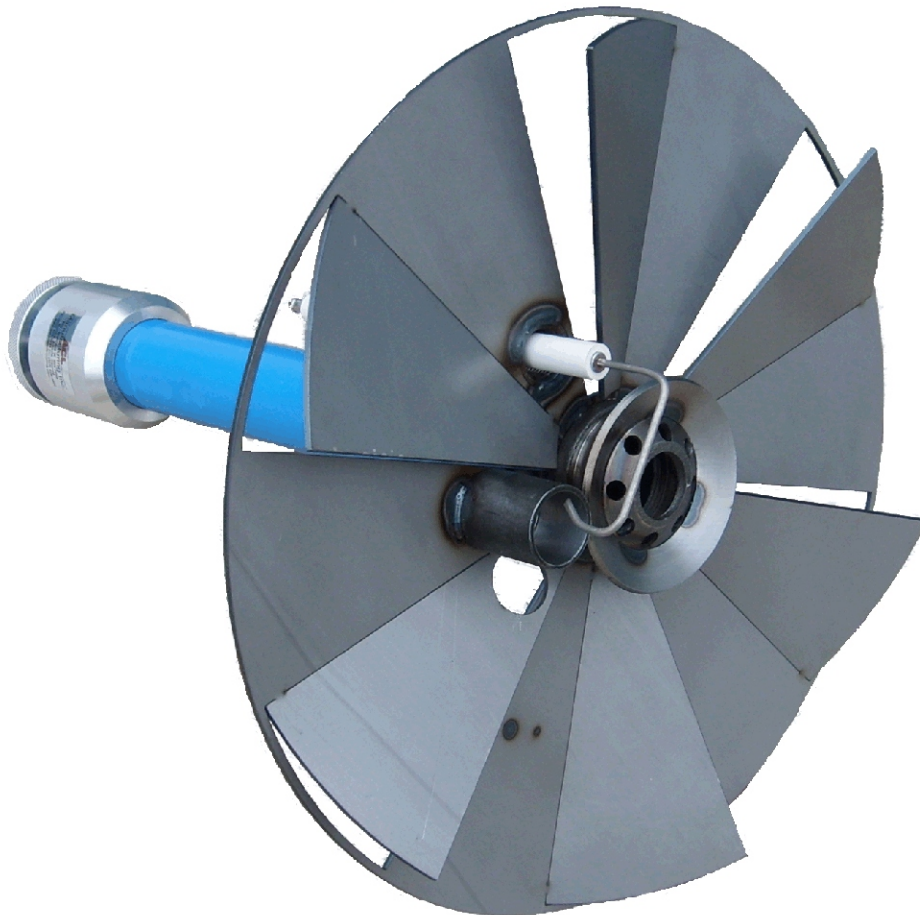
The ACL HE-ON burner assembly has been designed for use with atmospheric, natural draft fire tube heating appliances (line heaters, reboilers, dehydrators, tank heaters, etc. ) to provide highly efficient and reliable operation. A wide range of burner sizes, easily positioned into any fire tube, are available to meet specific heating requirements. Complete burner assembly includes ACL M series mixer, ON nozzle, pilot, ignitor/flame rod, pre-drilled orifice, and venturi barrel. With the addition of an ACL combustion safety controller and engineered valve train, it completes a cost effective system for safely igniting, monitoring, and controlling the heating process.



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## Features

- Patented Burner
- High efficiencies (typically 80%)
- Safe and reliable ignition/flame sensing
- Extremely stable at wide range of pressures
- Quiet operation
- Reduced emissions (No CO and low Nox)
- Easy to install
- No flame impingement
- No flame lift-off
- Unique flame profile that maximizes heat transfer
- Innovative, compact design



# ACL HIGH EFFICIENCY BURNER ASSEMBLY

## ACL M Series Mixers



**M75**



**M100**

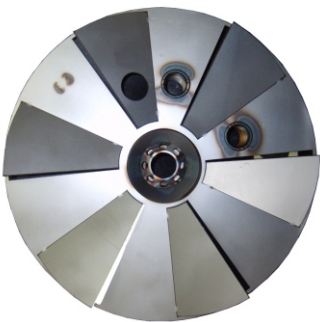


**M150**



**M200**

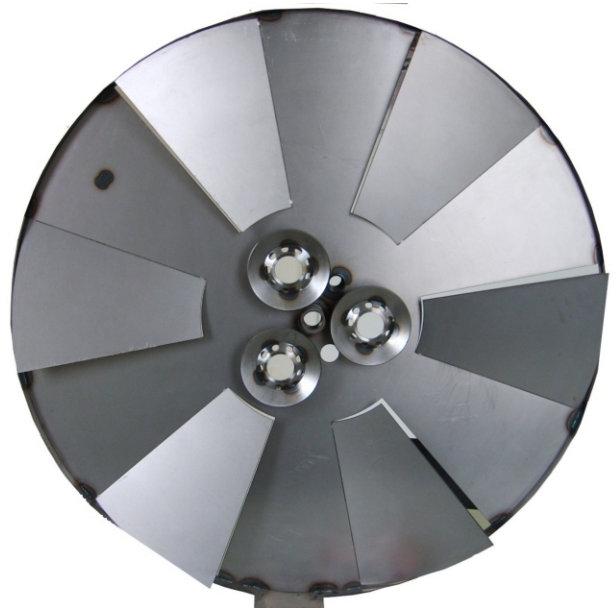
## ACL ON Nozzles



Single Burner  
ON Nozzle



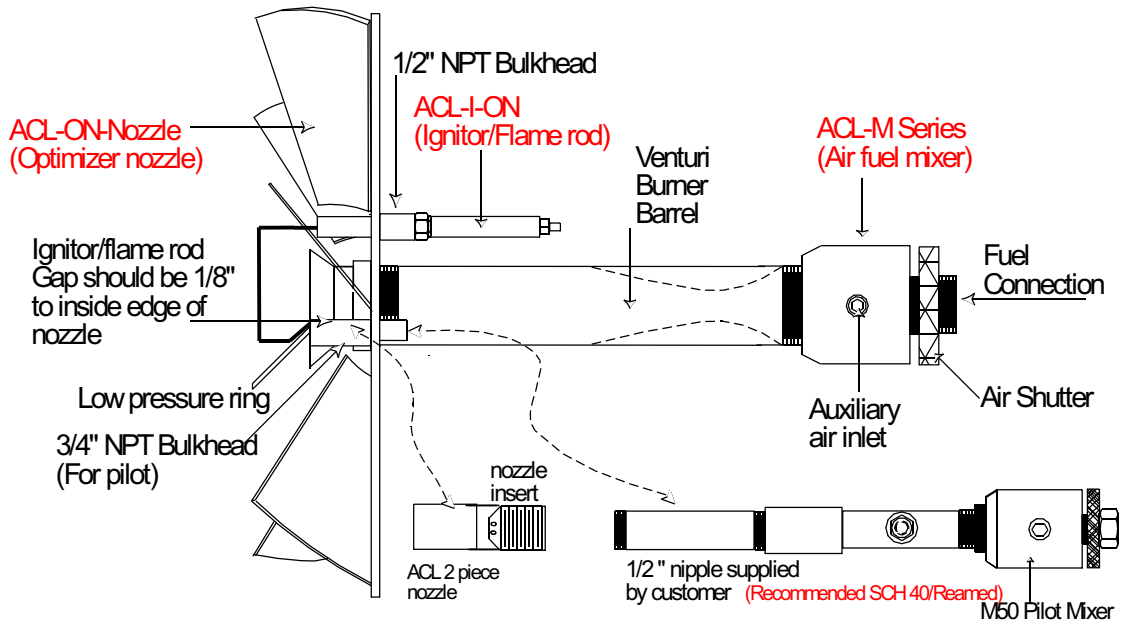
Dual Burner  
ON Nozzle



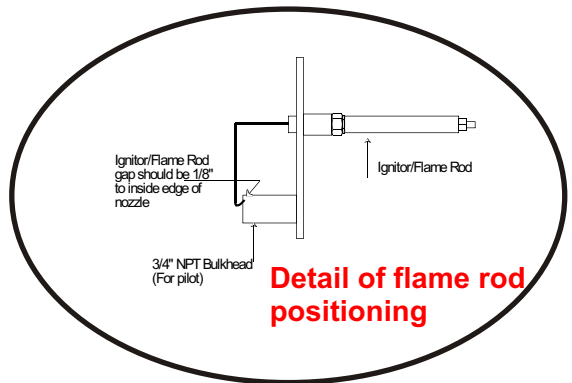
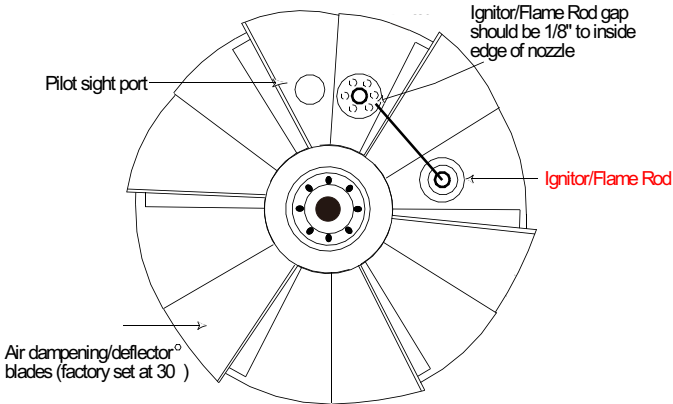
Triple Burner  
ON Nozzle

# ACL HIGH EFFICIENCY BURNER ASSEMBLY

## ACL HE-ON SINGLE BURNER



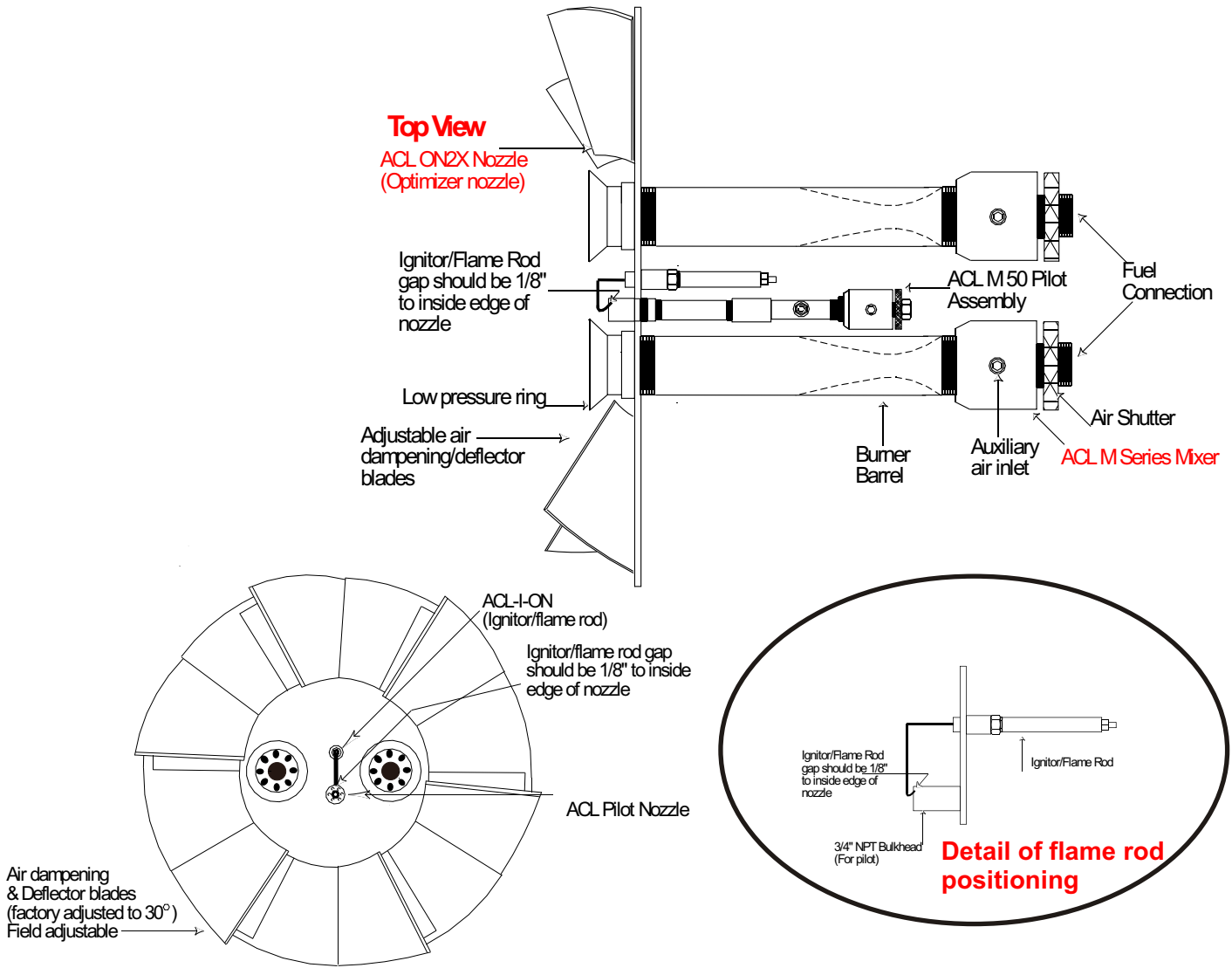
**ACL HE-ON Burner Front View**



ACL M Series Mixer	Mixer Connection size	BTU Range	Fuel Connection size	Auxiliary Air Inlet	Burner Barrel		ON Nozzle	
					XX= Barrel length	Part #	Connection	Part #
<b>M75</b>	3/4" NPT	100,000 to 600,000	1/8" NPT	1/8" NPT	B075XX	3/4" X 1" NPT	ON100XX	1" NPT
<b>M100</b>	1" NPT	500,000 to 1,000,000	1/4" NPT	3/8" NPT	B100XX	1" X 1" NPT	ON100XX	1" NPT
<b>M150</b>	1 1/2" NPT	750,000 to 1,500,00	3/4" NPT	1/2" NPT	B150XX	1 1/2" X 1 1/2" NPT	ON150XX	1 1/2" NPT
<b>M200</b>	2" NPT	1,500,00 to 2,500,00	3/4" NPT	1/2" NPT	B200XX	2" X 2" NPT	ON200XX	2" NPT

# ACL HIGH EFFICIENCY BURNER ASSEMBLY

## ACL HE-ON DUAL BURNER



ACL M Series Mixer	Mixer Connection Size	BTU Range	Fuel Connection Size	Auxiliary Air Inlet	Burner Barrel		ON Nozzle	
					XX= Barrel length	XX= Firetube Diameter	Part #	Connection
(2)M75	3/4" NPT	200,000 to 1,200,000	(2)1/8" NPT	1/8" NPT	(2)B075 <u>XX</u>	3/4" X 1" NPT	ON2X100 <u>XX</u>	1" NPT
(2)M100	1" NPT	1,000,000 to 2,000,000	(2)1/4" NPT	3/8" NPT	(2)B100 <u>XX</u>	1" X 1" NPT	ON2X100 <u>XX</u>	1" NPT
(2)M150	1 1/2" NPT	1,500,000 to 3,000,000	(2)3/4" NPT	1/2" NPT	(2)B150 <u>XX</u>	1 1/2" X 1 1/2" NPT	ON2X150 <u>XX</u>	1 1/2" NPT
(2)M200	2" NPT	3,000,000 to 5,000,000	(2)3/4" NPT	1/2" NPT	(2)B200 <u>XX</u>	2" X 2" NPT	ON2X200 <u>XX</u>	2" NPT

# ACL HIGH EFFICIENCY BURNER ASSEMBLY

## Mixer and Orifice Size

ACL M Series Mixers and orifices are sized/pre-drilled to meet the BTU requirements of the heating application. Orifice size is based on field applications that have proven efficiencies when operating at a fuel gas operating pressure of 9 PSI. **Recommended ACL Mixer/Orifice Size** for use with natural gas or propane on pages 7-8.

## ON Nozzle

ACL ON Nozzles with adjustable air dampening/deflector blades produce a stable flame profile that ensures even heat distribution to the fire tube. Blades are factory set at 30° to control secondary air - further field adjustments may be required to achieve optimum efficiency. The low pressure zone established by the unique design of ACL ON nozzles ensure that there is no flame lift-off.

## Burner Barrel

Air fuel mixing is maximized by the venturi burner barrel. With the ACL M Series Mixer placed in the flame arrestor chamber, the length of the burner barrel should be sufficient to position the ON Nozzle into the wetted section of the fire tube.

## Pilot Assembly

To incorporate ACL pilot assembly, simply screw pilot nozzle into ½" bulkhead on front side of ON nozzle, beside the sight hole, using ½" close nipple.

## Ignitor/Flame rod

Flame acknowledgement and reliable ignition is established by proper positioning of ACL Ignitor/Flame rod. For strongest flame current, the Ignitor/Flame Rod gap should be 1/8" to inside edge of pilot nozzle.

## Operation

Completely close the air shutter on the ACL HE-ON burner assembly, then open two full turns before igniting. Upon ignition and with stable fuel gas operating pressure, adjust air shutter to achieve a strong blue flame with visible orange tips. Use the locking nut to secure the air shutter in position. For further tuning, the use of a flue gas analyzer is recommended.

# ACL HIGH EFFICIENCY BURNER ASSEMBLY

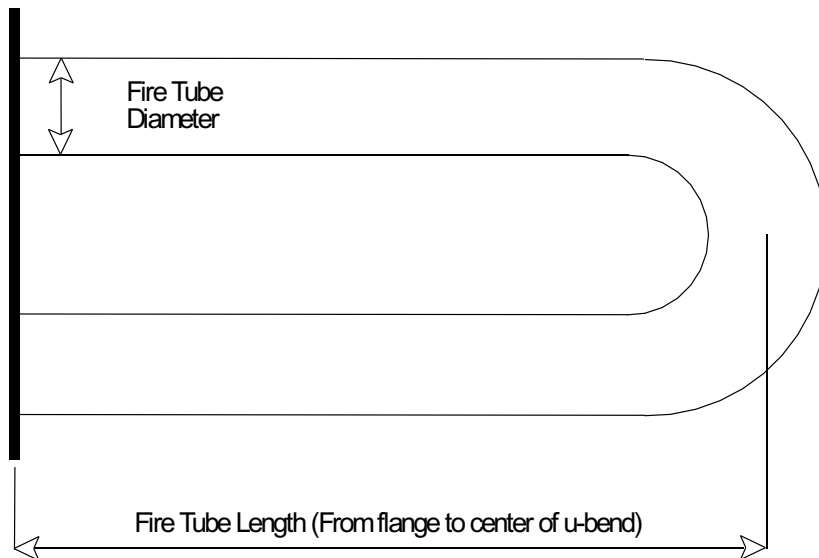
## Recommended ACL Mixer/Orifice Size (Propane)

Fire Tube Diameter	Fire Tube Length	Total Net Heat	ACL Net Heat Required	ACL Mixer	MTD Orifice Size	DIA. IN. Orifice Size
		1. (BTU/HR)	2. (BTU/HR)			
6"	6	221,124	170,095	M75	MTD-51	1/16"
	7.5	273,157	210,120	M75	MTD-48	5/64"
	9	325,190	250,146	M75	MTD-46	5/64"
8"	8	378,200	290,923	M75	MTD-43	3/32"
	10	468,520	360,400	M75	MTD-41	3/32"
	11.5	536,261	412,508	M75	MTD-37	7/64"
10"	10	583,261	448,662	M75	MTD-36	7/64"
	12	696,527	535,790	M100	MTD-31	1/8"
	14	809,100	622,385	M100	MTD-30	1/8"
12"	11	759,354	584,118	M100	MTD-30	1/8"
	14	959,631	738,177	M150	MTD-29	9/64"
	17	1,159,907	892,235	M150	MTD-24	5/32"
14"	12	907,104	697,772	M150	MTD-29	9/64"
	15	1,127,016	866,935	M150	MTD-25	5/32"
	18	1,346,927	1,036,097	M150	MTD-19	11/64"
16"	14	1,204,242	926,340	M150	MTD-24	5/32"
	17	1,455,570	1,119,670	M150	MTD-18	11/64"
	20	1,706,897	1,313,000	M200	MTD-13	3/16"
18"	16	1,543,268	1,187,129	M200	MTD-18	11/64"
	20	1,920,259	1,477,122	M200	MTD-11	3/16"
	23	2,203,003	1,694,617	M200	MTD-51	7/32"
20"	18	1,924,182	1,480,140	M200	MTD-9	13/64"
	22	2,343,061	1,802,354	M200	MTD-3	7/32"
	25	2,657,220	2,044,000	M200	MTD-1	15/64"

Please call for fire tubes not listed for more precise orifice sizing.

Actual ACL M Series Mixer and orifice size may vary by application (values are approximate).  
Recommended fuel gas operating pressure of 9 psi .

1. Maximum heat transfer of tube.
2. Approximate maximum heat required when using ACL Burner.



# ACL HIGH EFFICIENCY BURNER ASSEMBLY

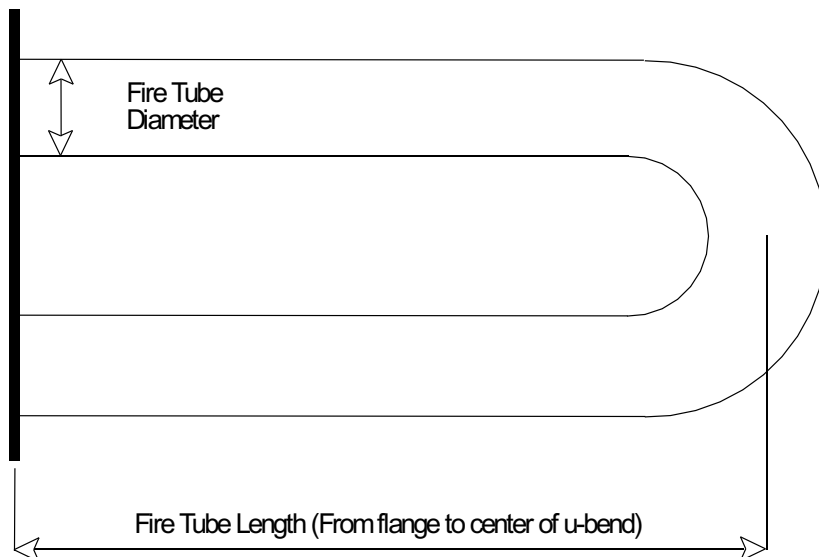
## Recommended ACL Mixer/Orifice Size (Natural Gas)

Fire Tube Diameter	Fire Tube Length	Total Net Heat	ACL Net Heat Required	ACL Mixer	MTD Orifice Size	DIA. IN. Orifice Size
		1. (BTU/HR)	2. (BTU/HR)			
6"	6	221,124	170,095	M75	MTD-44	3/32"
	7.5	273,157	210,120	M75	MTD-42	3/32"
	9	325,190	250,146	M75	MTD-38	7/64"
8"	8	378,200	290,923	M75	MTD-36	7/64"
	10	468,520	360,400	M75	MTD-31	1/8"
	11.5	536,261	412,508	M75	MTD-30	1/8"
10"	10	583,261	448,662	M75	MTD-29	1/8"
	12	696,527	535,790	M75	MTD-27	9/64"
	14	809,100	622,385	M75	MTD-22	5/32"
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	14	959,631	738,177	M100	MTD-16	11/64"
	17	1,159,907	892,235	M100	MTD-10	3/16"
14"	12	907,104	697,772	M75	MTD-18	11/64"
	15	1,127,016	866,935	M100	MTD-11	3/16"
	18	1,346,927	1,036,097	M100	MTD-4	7/32"
16"	14	1,204,242	926,340	M100	MTD-9	13/64"
	17	1,455,570	1,119,670	M150	MTD-3	7/32"
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18"	16	1,543,268	1,187,129	M150	MTD-2	7/32"
	20	1,920,259	1,477,122	M150	MTD-E	1/4"
	23	2,203,003	1,694,617	M150	MTD-H	17/64"
20"	18	1,924,182	1,480,140	M150	MTD-E	1/4"
	22	2,343,061	1,802,354	M200	MTD-J	9/32"
	25	2,657,220	2,044,000	M200	MTD-L	9/32"

Please call for fire tubes not listed for more precise orifice sizing.

Actual ACL M Series Mixer and orifice size may vary by application (values are approximate).  
Recommended fuel gas operating pressure of 9 psi .

1. Maximum heat transfer of tube.
2. Approximate maximum heat required when using ACL Burner.







Website: [www.aclmfg.com](http://www.aclmfg.com)

## **Limited Warranty**

Seller warrants that the product hereby purchased is, upon delivery, free from defects in material and workmanship and that any product which is found to be defective in such workmanship or material will be repaired or replaced by Seller for a period of one year from purchase date. Warranty of such items do not include shipping, installation or set-up.

## **Liability Statement**

ACL Manufacturing Inc. Shall not be liable for any special, indirect, consequential or other damages of a like general nature, including, without limitation, loss of profits or production, or loss of expenses of any nature incurred by the buyer or any third party.

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