

Operations and Maintenance Manual for

INDUSTRIAL MICRODIFFUSION OIL BURNERS

Models MD-25-O...MD-2500-O

December 2012

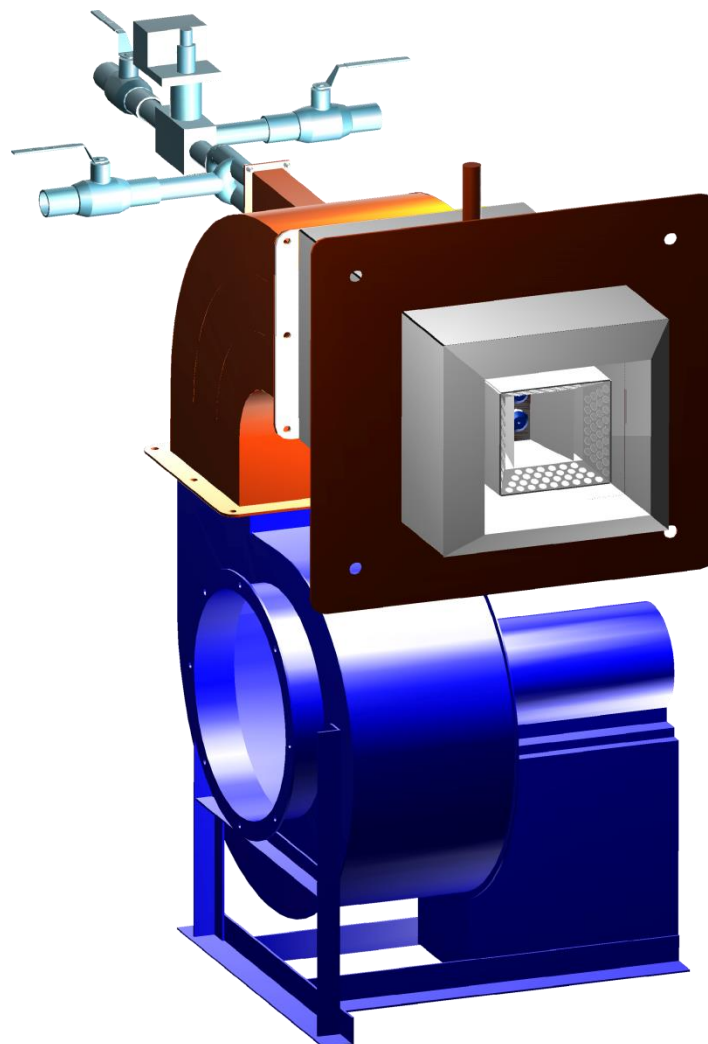


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INTRODUCTION

DISCLAIMER

In accordance with the manufacturer's policy of continual product improvement, the product presented in this brochure is subject to change without notice and obligation.

Periflame warrants that these burners do not infringe upon any United States patents.

AUDIENCE

This manual is written for specialists who are already familiar with all aspects (selection, use, maintenance) of operation of gas burners and fuel-firing equipment (furnaces, boilers, air heaters, etc.). The personnel working with these burners should have corresponding qualification. Specialists must know general principles of usage and maintenance of gas burners.

OVERVIEW

This manual describes in detail specifications, installation instructions and usage cases for PeriFlame Burners. PeriFlame offers a variety of industrial burners for industrial heating applications. Periflame's products, designed by our experienced Engineering Department, reflect our commitment to excellence. We design and optimize our burners and combustion chambers to meet our clients' requirements and we guarantee exceptional results. Our customer-oriented approach and state-of-the-art technology make PeriFlame an attractive, innovative solution.

SAFETY

This manual is written for specialists who are already familiar with all aspects (selection, use, maintenance) of operation of gas burners and fuel-firing equipment (furnaces, boilers, air heaters, etc.). The personnel working with these burners must have all corresponding qualification. It is assumed that specialists know general principles of gas burner implementation, operation, usage and maintenance.

Legend:



DANGER



WARNING

You must know the meaning and importance of all safety symbols



DANGER

All fuel burning devices are capable of producing fire and explosions when improperly applied, installed, adjusted, controlled and maintained.

The probability of depressurization of fuel train system always exists.

For normal operation burner needs a pressure difference. Pressure difference can be provided by a blower or other configurations. The probability of malfunction of pressure difference system always exists.



DANGER

Do not bypass any safety features. Bypassing safety features can cause Fire and explosion.

For your safety

For your safety, our burners can have a minimal inlet gas (fuel) pressure and any required air pressure difference.



WARNING

Burner parts might be hot during operation. Always use appropriate caution when approaching the burner.

For your safety

Adjustment and maintenance of burners (mechanical and electrical parts) must be administered by qualified personnel that are experienced in combustion equipment.

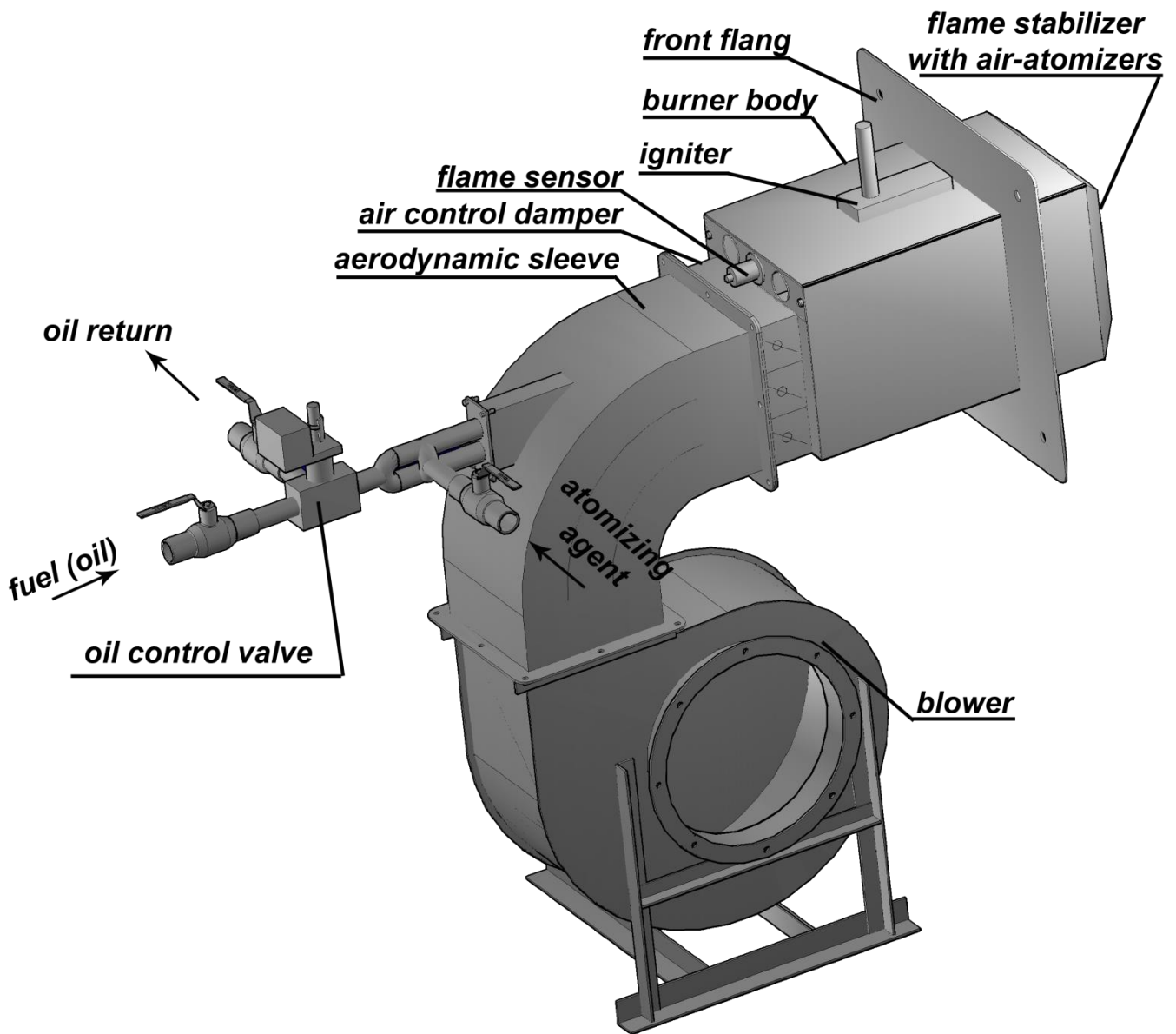
Continuous retraining of operators must be administered to ensure a high degree of proficiency.

For additional information

P.O. BOX 9704 Arlington VA, 22219, USA

MD BURNERS OVERVIEW

DESCRIPTION



Pic. 1 – Oil burner MD-O with blower or aerodynamic sleeve.

- MD-O burners are intended to fire any light or heavy oil fuels with various oxidizing parameters inputs.
- MD-O burners use patented flame-holder system with direct-flow microdiffusion stabilizers. Stabilizers have oil sprayer system with air-atomizers, which provides developed zone of reverse currents for oil-firing stabilization. In addition, burners utilize the most optimum assemblage of combustion parameters.

- MD-O burners provide a stable flame over all capacity ranges (25–100 %) at excess air factors from 0.8 up to 3. Absence of CO emission warrants at excess air factors from 1.1 to 1.70 for light oil and from 1.20 to 1.90 for heavy oil.
- Low NOx emission is accomplished due to entirely transparent gas flame and a patented method of microdiffusion combustion.
- Burners are available in 12 sizes, which operate over a range of 0.25MW to 35 MW. MD-O burners are compatible with all types of ovens, boilers, vaporizers, dryers and heaters.
- Every burner is equipped with an electric igniter, main combustion gas control valve, oil control valve, and multi-blade air damper. Each control valve and damper has servomotor (110 V, three-point guidance) and position sensor (potentiometer with resistance 1k, 5k or required).
- The burner can be completed with an aerodynamic sleeve and/or air blower.

MANUFACTURING MATERIALS


AISI 310 (1.4541) for burner parts with the flame and shielding. AISI 304 (1.4301) for other parts. Blower housing and burner sleeves are optional. Available in 100% stainless steel or in painted carbon steel.

MARKINGS

- MD-400-O-L: light oil burner of 5,0 MW (according to “Specifications”) completed with an aerodynamic sleeve, an electric igniter, gas control valve, oil control valve, oil cock with an adjustable orifice and air control damper.
 - Each control valve and damper has servomotor (110 V, three-point guidance) and position sensor (potentiometer with resistance 1k or 5k or required).
- MD-400-O-H: heavy oil burner of 5,0 MW (according to “Specifications”) completed with an aerodynamic sleeve, an electric igniter, gas control valve, oil control valve, oil cock with an adjustable orifice and air control damper.
- MD-400-O-H-A500: the maximum preheat combustion air temperature is 500 F.
- MD-400-O-H-O(A-50%+O2-50%)500: the maximum preheat oxidizer (air-oxygen mixture) temperature is 500 F.
- MD-400-O-L-B: the burner has an air blower instead of an aerodynamic sleeve.

PRODUCT LABEL

All PeriFlame burners come with a unique Serial Number for identification and tracking purposes.

		www.periflame.com	
Burner type MD-	<input type="text"/>	- <input type="text"/>	- O - <input type="text"/>
Capacity	<input type="text"/>	MW Input oil	<input type="text"/>
S/N	<input type="text"/>	MM/DD/YY	<input type="text"/>

SPECIFICATIONS

Specification	Value
Minimal excess air factor over capacity range light/heavy oil	1,10 / 1,25
Admissible increase of excess air factor over capacity range	0,6
Minimal oil inlet temperature (light / heavy), F	50 / 200
Oil inlet pressure (light / heavy), bar	2,5 / 4,5
Atomizing air (steam) pressure (light / heavy), bar	2,5 / 4,5
Atomizing air (steam) flow rate (specific), m ³ /(hour·MW)	3 – 5
Combustion air pressure diff. at n=1,1, mbar	15
Air turndown (gas / oil)	1:10 / 1:4
Pilot capacity,%	3-5
Expansion angle of a flame, °	40 – 60

Burner	Capacity range, MW	Burner cross-section (height x width), mm
MD-25-O	0,07...0,3	95 x 95
MD-40-O	0,15...0,6	104 x 104
MD-75-O	0,2...1,0	144 x 144
MD-150-O	0,3...1,5	164 x 164
MD-200-O	0,4...2,2	196 x 196
MD-250-O	0,6...3,2	244 x 248
MD-400-O	0,9...5,2	300 x 300
MD-700-O	1,4...8,5	337 x 338
MD-1000-O	2,1...12,5	390 x 390
MD-1500-O	2,4...16,0	470 x 470
MD-2000-O	3,0...22,0	500 x 500
MD-2500-O	4,5...32,0	548 x 526
MD-5000-O	12,0...55,0	774 x 774

BURNER SELECTION

Burner selection includes next steps:

- capacity (see *Specifications* above)
- oil pressure (based on project requirements)
- combustion chamber pressure measuring (accordingly to equipment)
- oxidizer parameters and air feeding type (accordingly to technological scheme)
- installation variant (we offer few variants, see below);
- additional requirements;
- FILL IN THE SELECTION FORM (Appendix #1).

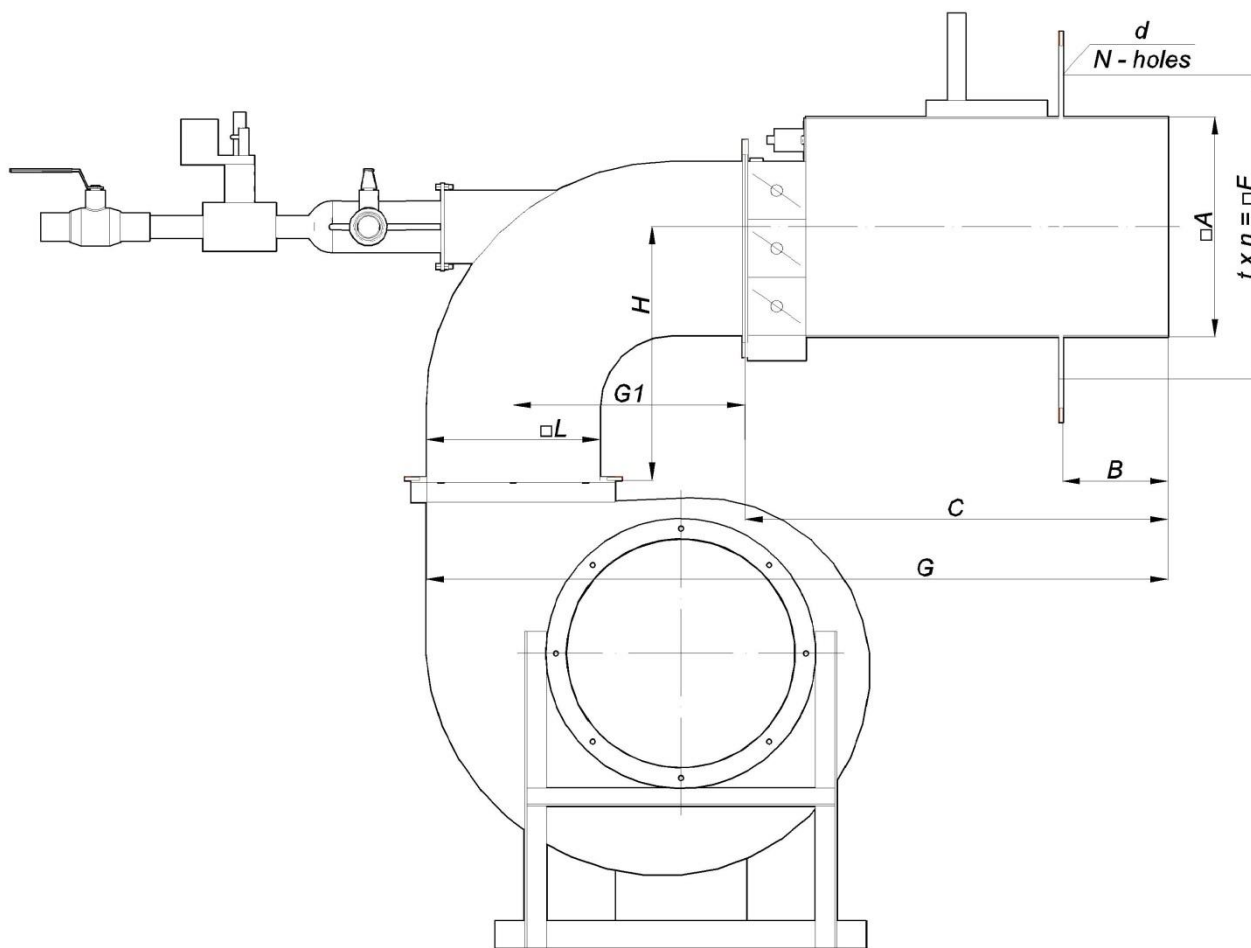
FLAME LENGTH AND COMBUSTION CHAMBER DIMENSIONS

For most types of equipment we recommend to choose a burner with a *Normal* flame length.

Flame length is given for light oil at excess air factor 1,2:

Burner	Max. flame length, m	Min. eq. diameter of comb. chamber, m
MD-25-O	0,4	0,4
MD-40-O	0,6	
MD-75-O	0,8	0,6
MD-150-O	1,0	
MD-200-O	1,5	0,9
MD-250-O	1,8	
MD-400-O	2,2	1,3
MD-700-O	2,7	
MD-1000-O	3,0	1,8
MD-1500-O	3,4	
MD-2000-O	4,0	2,2

DIMENSIONS



Pic. 2 – Oil burners dimensions.

Oil burner dimensions are represented in the table below, mm (may vary).

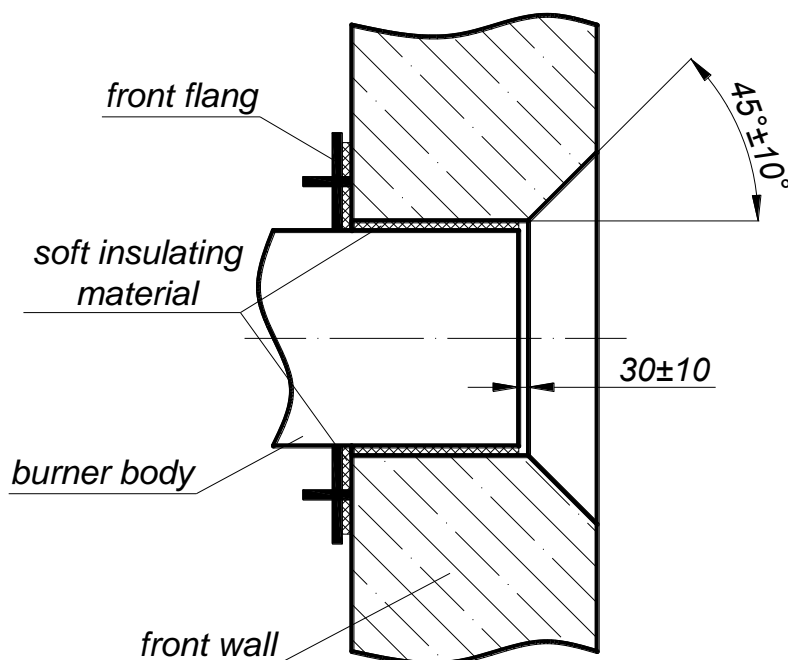
Burner	Burner's dimensions, mm								Sleeve dims, mm			G
	A	B	C	F	t	n	N	d	L	G1	H	
MD-25-O	95	135	350	175	175	1	4	14	75	200	210	588
MD-40-O	104	140	400	184	184	1	4	14	75	200	210	638
MD-75-O	144	150	450	224	224	1	4	18	140	300	300	820
MD-150-O	164	160	500	264	264	1	4	18	140	300	310	870
MD-200-O	196	160	500	296	296	1	4	18	175	400	410	988
MD-250-O	238	170	500	338	338	1	4	18	175	400	430	988
MD-400-O	300	180	550	420	420	1	4	18	220	470	510	1130
MD-700-O	338	180	550	458	458	1	4	21	280	520	550	1210
MD-1000-O	390	180	600	540	270	2	8	21	350	550	570	1325
MD-1500-O	470	200	600	620	310	2	8	21	430	600	620	1415
MD-2000-O	500	210	600	650	325	2	8	21	450	600	620	1425
MD-2500-O	548	210	600	698	349	2	8	21	500	700	720	1550

INSTALLATION

PeriFlame strongly recommends organizing an embrasure of the burner in accordance with the scheme below. Otherwise must fulfill the following demands:

- must expel contact of combustion products to an exterior parts of the burner's body;
- must consider that high furnaces gases near a flame will influence burning characteristics.

Burner embrasure in front wall of combustion chamber:



Pic. 3 – Burner embrasure (recommendations).

Pipe connection

The oil inlet of MD burners can be supplied with NPT ½ in. fitting for sizes from MD-25-O to MD-400-O and with NPT 1 in. fitting for sizes from MD-700-O to MD-2000-O.

Burner and air inlet orientation

Normal position of burner means that aerodynamic sleeve directs air flow from below upwards to the burner. Reverse position means the contrary.

The burner can be positioned horizontally.

Air inlet System

Every burner has multi-blade damper for creating optimal aerodynamic structure of oxidizer. In addition, the damper allows for best flame stabilization and for supplying of required flame shape. Air inlet system can consist of aerodynamic sleeve with rotation displacement at 90° or from a blower.

OPTIONAL EQUIPMENT

Combustion chamber pressure control

When commissioning the burner pressure differentials, measurements between input lines and the combustion chamber are required. Air blower or other air feeding system must be correlated and tuned with this pressure. It is very important to know exact pressure at the *peak* capacity when the system is being designed.

Fuel pressure control and oil train safety system

The burner has combustion oil control valve. Oil inlet pressure (before the control valve) can be defined by the Customer or chosen from the following meanings: 2,5 or 5,0 bar for light oil and 4,5 or 10,0 bar for heavy oil.

Fuel train safety system should be designed to meet the requirements of the local codes and insurance carriers.

Ignition system

Electric igniter consists of pilot gas cock with an adjustable orifice and full-wave spark transformer.

Advised pilot capacity should be about 3-5% of nominal. Pilot gas piping diameter is ½ or 1 in.

Flame monitoring system

The burner has two different brackets for flame sensor installation. Flame sensor (UV scanner) must be matched with the flame monitoring system.

MD burners can be supplied with UV sensor for flame detection with relay output.

APPENDIX



APPENDIX #1 – BURNER ORDER FORM

#	Feature	Value			
1	Capacity, MW				
2	Main oil fuel	Light:		Heavy:	
3	Fuel pressure, mbar				
4	Combust. chamber pressure (diapason)	-	mbar	+	mbar
5	Air feeding type	blower		sleeve	
6	Oxidizer parameters (if with a sleeve)	P=	mbar	T=	° F
7	Installation variant	NR	NL	RR	RL
8	Additional requirements				

Send request to get detail information.

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