



INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR "IIP-ENCON" FILM BURNERS

I. SELECTION OF BURNER

IIP ENCON 'Film' Burner are available in four different sizes. Due to its large 'Turn Down Ratio' of 7:1, these four sizes of burners cover a wide range of application. The burners selection should be done, keeping in mind the oil firing rate required for the furnace. In a furnace it is better to use more burners of smaller size (if space permits) than one burner of higher capacity. The different models of burners and their oil firing rates are as under :

AIR PRESSURE

Burner Size	500 mm w.g. oil 1/hr.		600 mm w.g. oil 1/hr.		700 mm w.g. oil 1/hr.		900 mm w.g. oil 1/hr.	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
2A	1	7	2	14	3	20	4	24
3A	2	14	3	20	5	35	7	40
4A	7	40	9	65	12	75	15	85
5A	15	85	17	110	20	120	25	150
6A	25	150	30	180	35	190	40	200
7A	40	200	45	150	50	160	60	350

II. INSTALLATION

The 'Film' Burner is supplied as complete assembly alongwith cast iron mounting plate, refractory block and burner plate are separate units and are to be properly matched with the burner size. The burner block and burner plate sizes have been given in figure on the back page.

(a) Installing the burner

The Burner should be mounted on the cast iron burner plate (fitted on the furnace shell) with the help of four bolts as shown in the diagram.

Ensure that the furnace steel plate has been adequately reinforced from all sides with the help of M.S. Channels.

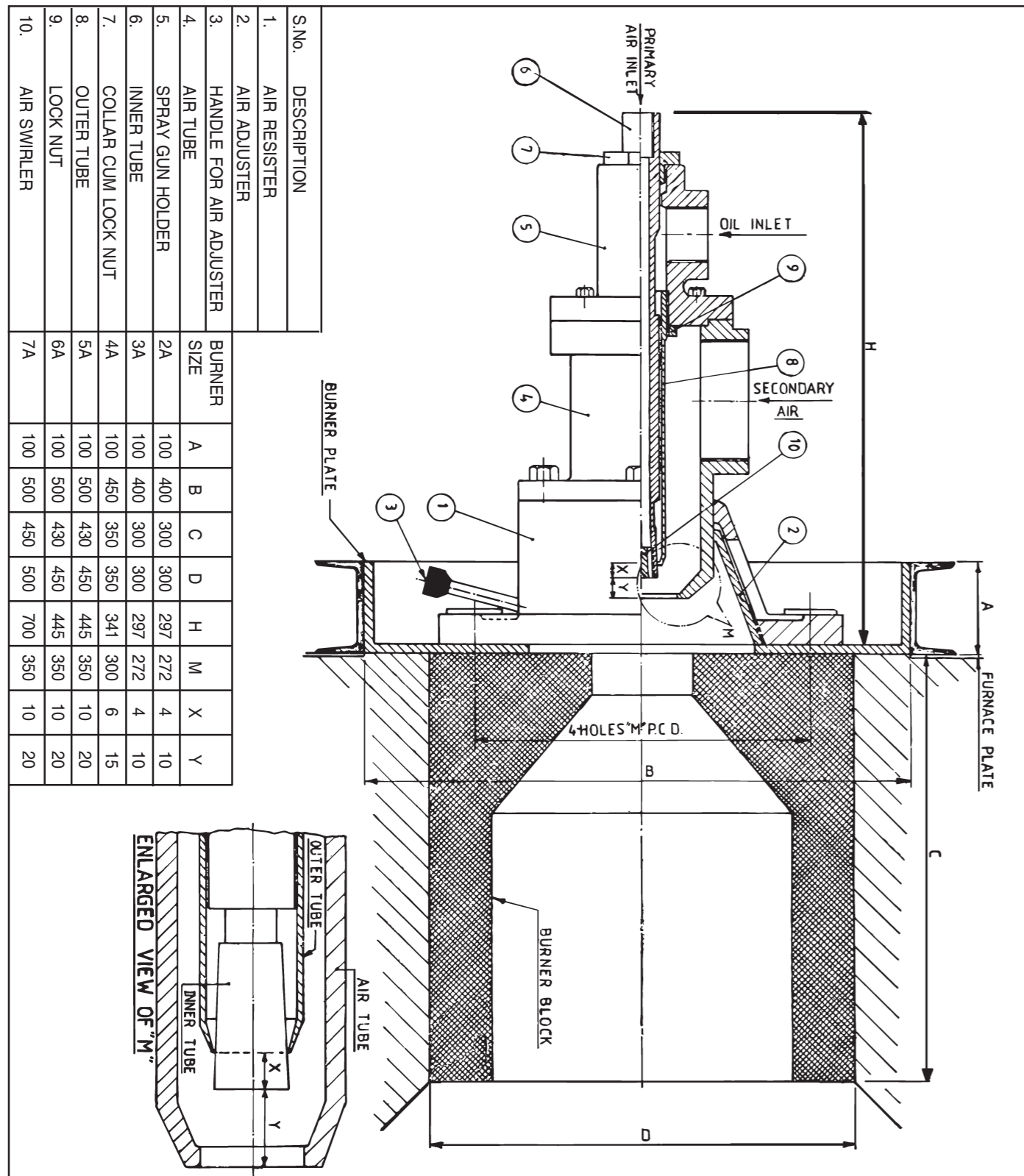
The cast iron burner plate has got two holes on each side. Similar holes should be drilled on the channels welded on to the furnace plate to accommodate the burner plate as shown in the figure.

Ensure that the burner block face is in touch with the cast iron burner plate surface and burner block is not cracked, while fitting.

Enough care is taken at our end during inspection and while despatching, to avoid any cracking of burner block. Any minor breakage of corners and chipping of the external surface of the burner block does not affect the working of the burners.

(b) Air connections

Air pressure has been mentioned in the chart against the burner size. Ensure the correct pressure of air is available near the burner for getting the desired oil firing rate. For light distillate fuels, such as, kerosene and light diesel oil, which do not require preheating, air pressure can be decreased by about 100 mm w.g. than what has been mentioned. For furnace oil and other residual fuels, the air pressure should not be less than 500 mm w.g.



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The air piping from the blower should have a minimum cross sectional area equal to blower discharge. It is preferred that a higher size of pipeline should be used. For example, if rectangular opening of the blower has got a discharge area equal to 100 mm dia a pipeline of 150 mm dia may be used. This is to ensure that there is a minimum pressure drop in the pipeline.

The pressure drop between blower and the farthest burner should not exceed 50 mm water gauge. There should be a minimum number of bends, elbows and valves in the pipeline to ensure that the pressure drop is kept at the lowest.

No elbow or bend should be placed within four pipe diameters distance from the burner inlet in order to ensure that the air enters the burner without any turbulence. The branch lines connected to the burner should be of one size larger than the burner inlet and finally reducing its size near the burner.

Each burner should be fitted with a separate butterfly valve to control the air supply.

Atomising air connections should be given to the burner with the help of flexible hose pipe by giving from the main air pipe, before butterfly valve, as indicated in the figure. The flow of atomising air should not be controlled and it should always be full open.

(c) Oil connections

The size of the pipeline from the line heater or from the heating & pumping unit should be of adequate size to avoid pressure drop and the size should be reduced nearer to the burner inlet. The oil should be pumped to the burners through a composite heating pumping unit. Oil pressure near the burner should be between 1 kg/cm² to 1.5 kg/cm².

ENCON 'Film' Burners are designed for furnace oil of viscosity of upto 200 seconds R.I. Furnace oil of viscosity 1500 seconds R.I. at 38° C. (presently available in the country) needs preheating to a temperature of about 90-100°C, for getting the desired viscosity at burner tip.

A 'Y' strainer of 15 mesh should be used just before the burners. If there are two or more numbers of burners near each other, a common 'Y' strainer can be used.

If the burner is to be used with heavy fuel oil requiring heating before atomisation, draining facilities should be provided. This will help the draining of hot oil between the heater and burner, when the furnace is not in use. Lights oils, such as LDO and HSD do not require such draining facility.

Micro valve should be fitted with each burner for the fine control of oil flow rate. ENCON micro valve is designed for fitting directly on the burner oil inlet.

III. OPERATION

Important :

Keep doors & damper in open condition before firing burners, Ensure the furnace chamber is free of combustible gases.

A. Starting of a new burner

- Before lighting up the burner, the burner block is to be heated by open flame, such as, kerosene soaked cloth introduced through the air opening of the burner. The preheating of burner block should be continued for 10-15 minutes.
- Start the heating & pumping unit and allow the oil to circulate within ring main till furnace oil attains a temperature of 90°C - 100°C.
- Start the blower and allow air to pass through the burner.



- After starting the air supply to the burners, open the micro valve and allow furnace oil supply to the burners. The micro valve should be opened very steadily and slowly to the minimum desired level. Normally, the steady flame will be achieved at position three of the micro valve, kerosene soaked cloth should continue to the burn till the flame stabilises.
- Allow the combustion to continue at the minimum level for about 5 minutes and then slightly increase the flow of oil to the desired level, keeping the supply of air full open.

B. Shut down of the burner

- Close the micro valve and stop the oil supply to the burner.
- After about one minute, close the butterfly valve in the air line or stop the blower and close the air ports of the burner.

Insert the shield to protect the burner choking due to cracking of fuel oil left over in the burner by the furnace heat.

C. Restarting of burner

- Remove the shield from the front of burner and keep the air sleeve open.
- Start the blower and allow the air to enter the burner with butterfly valve fully open.
- If the furnace is already hot (min. 700°C) open the micro valve slowly. The oil will automatically ignite and stable flame will be established.
- If the furnace is cold, follow the same procedure as mentioned above for starting the new burner.

IV. BURNER CLEANING

- Remove the primary air connection.
- Open the four bolts of spray gun holder (5).
- Remove oil connection from the micro valve.
- Take out the oil spray gun assembly consisting of inner tube, outer tube and spray gun holder.
- Dismantle all the components, such as, lock nuts (7&9), inner tube (6), outer tube (8) and air swirler (10).
- The inner tube (6), outer tube (8) and air swirler (10) should be kept immersed in kerosene for about 15 minutes.
- Clean all these components with the help of soft cloth and remove all the carbon deposit.
- Reassemble the oil spray gun assembly and ensure that the distance 'X' is maintained as desired and tighten the lock nuts.
- Ensure that asbestos rope packing is provided before tightening the collar cum lock nut (7) to avoid any oil leakage.
- Fix the oil spray gun assembly in the burner and tighten the bolts. Check that gasket in between the oil spray gun holder and the air tube (4) is not damaged. Change the gasket if required.
- Reconnect the primary air hose and the micro valve assembly. Ensure that the micro valve is cleaned by flushing with kerosene before it is fitted.