MFB IR BURNER

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	The metal fibre burners represent the state-Of-the technology in gas infrared. It combines the low operating cost advantage if gas with unique features such as • Unbreakable construction, with very high life. • Short heat-up and cool down time (3- 4 seconds) when used in the fan driven mode. • Absolute uniformity of radiation over the emitting surface even in case of 2- 3 n long burners. • Flexibility of Shape. • Thermal & mechanical shock –proof.
	There are two basic types: MFB Cloth : NIT 100 and NIT 200 Sintered Mat : AC 100
	Construction Of MFB Burner. The cloth does not have strength of its own. A thin performed sheet supports it. Housing is made of SS 304 and it fully welded with diverters inside for equal distribution of premix. The mat is fully welded along its periphery. The housing can be made with or without collar. General preference for a burner is without collar. Gas entry is either from back or from side (height increases in case of side entry). NIT 200 is medium density,2.5 Kg/m2 and is used mainly for application.
	Construction Of Sintered Mat Burner. AC 100 is high density, 4 Kg/m2 and is used mainly for applications where the burner surface temperature are consistency high. As the mat has strength of its own, it can be clamped between the housing and a flange with the help of bolts. Rest of the construction is as per the MFB design.
	Operation. The burner can be fired facing sideways, up or down (with some care). Also it can be fired vertically with no loss of uniformity till a heated length of 1000 mm. Atmospheric firing is inexpensive but possible only if a pressure of 120 mbar is available. Also it has less modulation capacity. Firing gas- air premix requires paraphernalia but it has higher modulation range and can work with lower pressures. Also with the addition of gas train it can be made reliable for long – term usage.

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II	GAS COMBUSTION
	Important note. Composition of gas is the most important parameter in designing a safe system. An installation is always set for one particular type of gas. Variation in this can cause safety hazards, for example if butane gas, flashback and Explosion can occur because of lower self ignition temperature of butane (450°C) as compared to 550°C for propane and 750°C for natural gas and also due to higher calorific Value of butane.
	Chemistry Of Combustion. Generally CO2 and H2O are formed as by products of combustion of hydrocarbons, For example, CH4 + ½ O2 + CH3 OH CH3 OG + ½ O2 + HCHO* + H2O HCHO + CO+ H2 H2 + ½ O2 + H2 O CO+ ½ O2 +CO2 *This is formaldehyde. If the mixture hits cold wall, the process stops here. This is why formaldehyde smell is observed in poor heat exchanger designs.
	Gas / Air ratios. ë= Stoichiometric ratio = 1 if air is just adequate for combustion. ë = 1 if air is excess ë = 1 if gas is excess.
	Radiation / Blue flame modes. With premix flow such that heat intensity is in the range of 100 – 500 KW/m2, most of the combustion takes place within the surface of the burner itself. This makes the surface heat, glow and transfer the heat in radiation form, This is infrared mode. Here the surface temperature is highest at 1050°C. If premix quantity is increased the burner actually cools down because of excess nitrogen flow. Combustion takes place outside the burner. This is blue flame mode. Here the heat transfer is in convention mode. Intensities as high as 20 MW/m2 are possible. In both the cases flue gas are release in the air. For radiation operation, ë = 1.05 to 1.1 For blue flame mode, ë = 1.1 to 1.2
	Efficiencies in radiation mode At lower intensities higher amount if combustion takes place within the surface. At around 125 KW/m2 the efficiency is highest at approx. 55 – 60% Below 100 KW/m2 the flame cannot be sustained. Efficiency is high is face down position. It can be increased in any position by adding a grid in front.