KLM Technology Group
#03-12 Block Aronia,
Jalan Sri Perkasa 2
Taman Tampoi Utama
81200 Johor Bahru
Malaysia

FIRED PROCESS FURNACE BEST PRACTICES

(PROJECT STANDARDS AND SPECIFICATIONS)

TABLE OF CONTENT

1.0 INTRODUCTION

Fired Process Furnaces are usually component parts of process plants. These are primarily used to heat hydrocarbons of all types, from heavy crude oils and asphalt to the lightest hydrocarbon liquids or gases. They may also be used to heat other substances such as air or steam.

A fired process furnace consists of three basic parts; a heating coil, a setting and a stack. The heating coil consists of length of tubing connected together which carry the material being heated. The setting is a suitable housing for firing. It is connected to a stack by means of a duct. The furnace may be fired by oil or gas burners. Instruments are generally used to control rate of firing and flow through coils to maintain desired operating conditions. The design, type, size and other similar design aspects of any individual furnace are based on and determined by various factors such as operating process, size of the unit, space available, economics, etc. However, safety and operational efficiency should be the primary factors in design consideration for furnace.

2.0 SCOPE

This document covers safety provisions in fired process furnaces in Petroleum Refinery, Chemical and Natural Gas Industry. These ishall be the minimum requirement and additional safety features have to be provided depending on individual situations. This does not include boilers and direct fired furnaces like direct fired air heater of FCCU and sulfur reaction furnace since they are specialty items.

3.0 LOCATION

The following factors should be considered while locating a fired process furnace:

3.1 General

Furnace should be located only at edges of the process units to limit the hazard of open flame to only the small part of the plant facing the furnace and also to facilitate easy firefighting operations in case fire breaks out in the furnace. Also the furnace should be at least 15 meters away from the nearest process equipment handling hydrocarbon, with no sewer boxes, sampling points, etc. in between, from where hydrocarbon could emit vapors when the furnace is on.

3.2 Safe Distance from Roads

There should be a minimum distance of 15 meters from the periphery of the furnace to the edge of any road with vehicular traffic.

3.3 Wind Direction

Furnaces should always be located upwind or side wind from the rest of the plant.

3.4 F.D. Fan Location

F.D. fans wherever applicable should be located at grade. Air intake to the FD fan should be from a safe location so that no hydrocarbon can be pulled into them.

4.0 CLEARANCE / ACCESSIBILITY

4.1 Bottom Fired Furnaces

There should be a minimum of 1.75 meters of headroom for the bottom fired furnace floor including plenum chamber, if any, above grade for operational conveniences and safety.

4.2 Multi Floor Side Fired Furnaces

For multi floor side fired furnaces, 1.0 meter wide platform and 2.0 meter high headroom should be provided.

4.3 Valves

Unless remotely operated, valves on the fire box purge and coil purging steam lines should be located at least 15 meters away from the furnace in the form of a manifold and distinctly marked for easy identification.

4.4 Dampers

Dampers should be operable from ground. Position of damper while in operation should be distinctly visible from ground.

4.5 Explosion Doors

Explosion doors shall be provided for all furnaces to release accidental over pressures. Explosion doors should be located in such a way that the discharge is directed to a safe area.

5.0 BASIC DESIGN CRITERIA

5.1 Configuration

The selection of the configuration of furnace, viz. vertical, horizontal, bottom fired, side fired, etc. should be judged from various design consideration like heat duty, service, etc. and safety consideration like layout limitations, accessibility, etc.

5.2 Materials of Construction

The selection of materials for various parts of the furnaces should be done depending on:

a) Temperature
b) Type of process fluid
c) Type of fuel used