

## Environmental Standards

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### Emission

#### BOILER (SMALL)

Steam generation capacity (tph)	Pollutant	Emission limit (mg/Nm <sup>3</sup> )
Less than 2	Particulate Matter	1200*
2 to less than 10	-do-	800*
10 to less than 15	-do-	600*
15 and above	-do-	150**

\* To meet the respective standards, cyclone/multicyclone is recommended as control equipment with the boiler.

\*\* To meet the standard, bag filter/ESP is recommended as control equipment with the boiler.

#### Note:

- I. 12% of CO<sub>2</sub> correction shall be the reference value for particulate matter emission standards for all categories of boilers.
- II. These limits shall supercede the earlier limits notified under Schedule I at Sr. No. (34) of EPA, 1986 (GSR 742E, dated 30 August, 1990)
- III. **Stack Height for Small Boilers**

**For the small boilers using coal or liquid fuels, the required stack height with the boiler shall be calculated by using the formula**

$$H = 14 Q^{0.3}$$

Where H = Total stack height in metres from ground level

Q = Sulphur dioxide (SO<sub>2</sub>) emission rate in kg/hr

**In no case, the stack height shall be less than 11 metres.**

**Where providing tall stacks are not feasible using above formula, the limit of 400 mg/Nm<sup>3</sup> for SO<sub>2</sub> emission shall be met by providing necessary control equipment with a minimum stack height of 11 metres.**

**Source: EPA Notification  
[GSR 176(E), April 2, 1996]**

#### Guidelines for Pollution Prevention in Small Boilers

Following GUIDELINES for Pollution Prevention in <2TPH small boilers are suggested. Guidelines are made for both boiler manufacture & boiler users separately.

#### Guidelines for Boiler Manufacturer

- i. The boiler should be provided with an ID fan of appropriate capacity.
- ii. A provision for sucking in secondary air above the fuel bed with adjustable opening area should be provided.
- iii. A butterfly type damper with appropriate arrangement for fixing damper at various

- positions easily, should be provided at the inlet side of the fan.
- iv. THE ID fan & damper should be located preferably nearer to the front side of boiler & should be easily accessible such that the boiler operator can access the damper easily & quickly & can operate while looking at boiler furnace condition.
  - v. A single cyclone of appropriate size be provided in the circuit alongwith "bottom storage hopper fitted with an air tight Rotary air lock valve with a handle".
  - vi. An economiser should be provided in the circuit for pre-heating boiler feed water.
  - vii. Proper "tube cleaning" arrangement & required tools should be provided along with its operating instructions.
  - viii. Proper instructions to be provided for obtaining and maintaining desired quality of boiler feed water & chemicals to be added to reduce/remove deposits on "water side of tubes".
  - ix. Proper information & instructions should be provided regarding, "which different fuels can be fired" in the boiler (Solid & liquid) and how it should be fired, how much at a time and desired frequency of its firing etc. (All the above mentioned information/instruction etc. could be compiled as part of the "Boiler Operating Manual" & supplied by boiler Manufacturer alongwith the boiler).
  - x. The flue gas carrying duct should be sized appropriately, say for peak flowrate gas velocity of 14 to 16 m/s to be maintained.
  - xi. A portable and simple to operate type (say, Pyrite kit) CO<sub>2</sub> monitoring instrument should be provided.

#### Guidelines for Boiler Users

- i. Solid fuels like coal briquettes etc. should be appropriately sized approx. 1 to 2 inch size /dia (large pieces to be broken, wherever required).
- ii. Fuel should be fired uniformly and in less quantity at a time such that the bed thickness does not exceed about 6 to 9 inches (and not in big heaps). Depending on high/low steam demand, the frequency of firing could be increased or decreased (say 4 to 5 times / hour during higher steam demand, or say 2 to 3 times /hr during lower steam demand).
- iii. Every time the fuel is fired, the damper should be set to " High" position for a minute or two (this would suck more combustion air required for burning volatile matter & thereby reduce soot / black smoke formation), and then it should be set back to "Low" position, till the next firing. (Setting could be made after a few trials). This damper adjustment should be done by the boiler operator throughout the boiler operation as a part of his regular duty like firing fuel for achieving optimised combustion at all time & thereby preventing pollution.
- iv. "Secondary air opening" to be kept full open at the time of firing for one or two minutes. Later, the opening "Must" be reduced till next firing. (Setting by trial & error).
- v. Fire bed should be cleaned at appropriate time to avoid build-up of "fire bed thickness", if not, this would reduce the primary air supply successively & result into improper combustion.
- vi. Soot deposits in tubes should be cleaned from time to time with proper tool. Build up of deposits effects the steam generation adversely and result into higher fuel gas temp. & higher stack loss.
- vii. The economiser should be kept properly insulated.
- viii. The cyclone bottom opening should be kept air tight & leak proof, else, it would reduce cyclone efficiency. The duct collected should be taken out from time to time( say once per shift) & appropriately disposed avoiding secondary pollution.
- ix. Good quality feed water should be used for boiler & appropriate chemicals should be added, as directed by boiler supplier, for avoiding tube deposits, else it would reduce steam generation.
- x. CO<sub>2</sub> % should be checked frequently (say once a day initially) to ensure proper boiler operation & take corrective actions, if required, immediately