



KERALA STATE POLLUTION CONTROL BOARD

കേരളസംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

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PCB/HO/SEE-3/TECH/110/2021

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Guidelines for Auditoriums, Hotels & Restaurants

1. In compliance with the order of the Hon'ble NGT dated December 20th, 2019 in the matter of O.A no. 400/2017, the CPCB prepared Mechanism/Guidelines for Control of Pollution and Enforcement of Environment Norms at Individual Establishments and the Area/Cluster of Restaurants/Hotels/Motel/Banquets etc.
2. As per the Hon'ble NGT order, the PCBs/PCCs in consultation/coordination with the concerned State Authorities shall adopt the same with necessary modifications but without diluting its essence.
3. In general, Marriage Halls, Party Venues and the likes end up creating water pollution, air pollution, solid waste problems, noise pollution and also cause public inconvenience due to lack of adequate infrastructure like vehicle parking space, proper waste collection and disposal systems and improper storage provisions.
4. The CPCB guidelines also specify that Eateries/Restaurants with seating capacity greater than or equal to 36 numbers shall install Effluent Treatment Plant and the treated effluent shall meet existing Environmental Standards notified by MoEF & CC vide GSR 794(E) dated 04.11.2009. These standards can be made more stringent by the SPCB. The units have to install electromagnetic flow meters at inlet and outlet of the ETP to record flow of effluent, energy meters to record the power consumption of the ETP and ensure maximum reuse of treated effluent for toilet flushing, gardening, floor washing and other non-potable purposes. The quality of treated

sewage and trade effluent is to be analyzed once in a month and report to be forwarded to the SPCB and the SPCB is required to make surprise cross checks.

5. As per the CPCB guidelines, the hotels and restaurants are also, within one year, required to ensure segregation of waste at source, facilitate collection of segregated waste in separate streams, handover recyclables to authorized waste pickers/recyclers. The biodegradable wastes are required to be processed, treated and disposed through composting/bio-methanation within the premises as far as possible. The residual waste shall be given to waste collectors or agencies as directed by the local body. Bigger units/star hotels are to develop green belt on its premises and are required to produce green belt development plan when applying for consent to operate.
6. There are practical difficulties for installing and operating Effluent Treatment Plant for small restaurants because of financial and space constraints. Hence, time bound implementation of the order have to be ensured.
7. In this context it may be noted that restaurant is a place to have food. Hotel provides accommodation besides food.
8. The water consumption of restaurants & food courts are as follows:

Type of building	Domestic (litres per head per day)	Flushing (litres per head per day)	Total (litres per head per day)
Restaurants	55	15	70
Food Court	25	10	35

9. The water consumption of Hotels are as follows:

Type of building	Domestic (litres per head per day)	Flushing (litres per head per day)	Total (litres per head per day)
Hotels (up to 3 Star)	120	60	180
Hotels (3 up to 5 Star)	260	60	320

The water consumption of residing staff has to be accounted for @ 135 l/head/day. In additions, water consumption of restaurants, conference hall/auditorium, laundry etc shall be assessed and added to get the total consumption.

10. The water consumption of Auditorium may be taken as 17.5 litres per head per day (thumb rule).
11. Approximately 80% of the water consumed is generated as waste water. Of the waste water generated, approximately 30% is sewage & 70% is sullage.
12. In case of restaurants with effluent generation less than 6000 litres/day (sullage), the following treatment system may be adequate: screening, grit cum oil separator and anaerobic system (eg. Septic tank)/ anaerobic filter followed by soak pit arrangement. Sewage generated can be disposed through septic tank and soak pit system.
13. For restaurants with waste water generation (sullage) of 6000-10,000 l/day the following treatment system may be adequate: screening, grit cum oil separation, pH dosing and anaerobic system followed by a fixed bed packing media and disinfection. Such an ETP of capacity 6,000- 10,000 l/day may cost minimum of ₹ 1.5-2 lakhs. It requires minimum area of 4m x 3m. However, for restaurants, hotels generating more than 10,000 l/day of effluent, full-fledged effluent treatment plant including secondary and tertiary treatment may be insisted for, if not already proposed. Sewage generated can be disposed through septic tank and soak pit system.
14. Compact type treatment system which can attain the quality within the standards specified can also be provided in place of the treatment systems specified in Para 12 & 13.
15. ETP using aeration is usually not suited for Auditoriums because functions happen only for very few days in a month in most cases and continuous operation of ETP may not be possible. Pulveriser (which can pulverize meat & fish bones) with bio-gas plant of adequate capacity is a suitable option

for food waste and waste water management in auditoriums. Alternately anaerobic systems with disinfection are also suitable. However, for auditoriums having functions regularly, full-fledged treatment system including primary, secondary & tertiary treatment systems shall be insisted. Regular functions mean 15 or more functions per month. This is only a thumb rule and may be considered based on the actual water consumption. Sewage generated can be disposed through septic tank and soak pit system.

16. On checking the online applications, it is seen that only the details of the ETP are reported. Details of solid waste are neglected and merely stated as disposed through piggery units in most cases. The applicant shall clearly report the details of solid waste generated under each category (food waste, plastic, garbage etc). There should be a systematic record keeping of these details.

17. Food waste generation from restaurants/hotels/auditoriums depend on the type and characteristics of the food and the character of the person consuming food. However, under Kerala conditions the food waste generation may be taken as 400-500g per seat per day based on the maximum quantity generated. So, for a restaurant with seating capacity 50, the food waste generation may be taken as 25kg/day (approximate average value). Above 3 Star, the quantity of food waste generation is less and comes to 100-200g per head per day. This is a thumb rule for food waste only. Garbage and other waste have to be assessed separately. The quantity of food waste generated from an auditorium depends on the type of food served, character of the consumer and number of functions. Hence it is difficult to provide a correct thumb rule. The auditoriums usually provide more food than the seating capacity. Sometimes two or more trips will be required. Hence it is advisable to take food waste generation as 400-500g per seat per day (based on the maximum solid waste generation (2 or more functions per day with more than one trip per function) including cooking

and food waste. This is only a thumb rule and may be considered based on the actual waste generation.

18. Food waste generated shall be properly segregated from paper (including paper cups/banana leaves) and other waste. The food waste generated shall be disposed through bio-gas plant/compost/organic waste converter. If the units do not have facility for the same, then food waste can be disposed through piggery units having valid consent of the Board or through the solid waste disposal facility of local bodies, provided, the local bodies have facility for the same. Non-bio degradable and domestic hazardous waste shall be segregated properly and transferred to local bodies or authorized agencies. Segregation of waste shall be correctly followed. Food transported to piggery units shall be in closed containers. Only cooked food remains shall be issued to piggery units (having valid consent of the Board) like this. The norms of the Animal Husbandry department have to be complied when transferring food remains to piggery units. Slaughter waste including chicken waste shall be disposed through rendering plants only and not to piggery units or authorized slaughter waste treatment & disposal facilities. Logbook shall be insisted for the daily quantum of food transported to piggery units/authorized slaughter waste treatment & disposal facilities. Hygienic conditions shall be insisted in all cases.
19. Bio-gas plant is the most common method for treatment of biodegradable waste. Minimum capacity of bio-gas plant is usually one cubic metre. It can be used for treating 10-15 kg biodegradable waste per day. Bio-gas plant with capacity two cubic metre and 5 cubic metre can handle 15- 20kg & 25 to 30 kg per day respectively of biodegradable waste. Of this one & two cubic metre plants are available readymade (portable). One cubic metre plant costs around ₹ 19,000 excluding transportation/GST etc. Five cubic metre & above involves civil construction and the former may cost ₹ 2.5-3.0 lakhs. These values may vary from place to place and with time.

20. Organic waste convertor (OWC) may be used in star rated hotels/auditoriums. It is available in capacity 100 kg & above. Conventional aerobic composting takes 90 days for getting converted into mature compost. In OWC, composting can be completed in 10-15 days. The food waste is chopped and shredded, mixed, aerated, fluidized, crushed and moisture adjusted in the OWC. Then inoculum for enhancement of composting rate and for odour masking are added. The total time in OWC is around 15 minutes per batch. It is then subjected to double curing for 10-15 days. For 100 kg/day convertor, an approximate area of 350sq.ft is required. The system has to be erected in a shed to protect from weather and around ₹ 6.5 lakhs is required for 100kg.
21. Fully automated in-vessel composting system that converts bio-degradable waste to compost in 24 hours is also available. In this process, the waste is loaded into a vessel to which inoculum is added and then mixed. Then the vessel is heated to the desired temperature. 80-90% of the biodegradable waste will be converted to vapour and the rest to compost. It is however costly and a 50 kg per day unit costs around ₹ 9 lakhs and require space of 60- 70 sq.ft. High electricity consumption is the main disadvantage of the process.
22. Solid waste generated has to be separated into wet waste and dry waste. These shall again be separated into bio-degradable and non bio-degradable portions and are to be collected in separate bins. The non bio-degradable dry waste has to be segregated into inert and hazardous waste. Hazardous waste, battery waste and e-waste have to be disposed through approved recyclers. Provisions shall be made for selling of recyclable waste to authorized vendors. During the construction phase empty cement bags shall be sold to agencies for recycling. Construction waste, broken bricks, waste plaster shall be used for land fill. Excavated soil shall be used for landscaping/land filling.

23. In many cases, the project proponents claim that major portion of the treated effluent is used for gardening/toilet flushing and the rest disposed through soak pit. In this regard, the project proponent is required to submit a water balance showing the total quantity of treated effluent generation and its total utilization through toilet flushing, gardening and soak pit. It has to be ensured that the soak pit is capable of absorbing the said quantity. For this, the project proponent shall produce a copy of percolation test done as per IS-2470-2 (1985) and report the standard percolation rate of the soil in the site. The applicant is also directed to submit sectional drawing of the soak pit/soak pits. The allowable rate of application of treated effluent in the pit shall be assessed using the table below:

Percolation rate (in minutes)	Maximum rate of treated effluent application (in litres per metre square of absorption area per day)
1 or less	204
2	143
3	118
4	102
5	90
10	65
15	52
30	37
45	33
60	27

The absorption area for soak pit is the side wall area and the effective depth being measured from 150mm below the invert level of the inlet pipe to the bottom of the pit. The quantity of treated effluent absorbed in the soak pit can be calculated from the absorption areas using above table.

24. The water requirement for gardening has to be reported correctly by the applicant. It may be noted that no lawn or landscape plants require daily watering. The project proponent shall report the hose diameter, number of sprinklers installed (N), capacity (C) of each sprinkler in litres per minute

and time of applying sprinklers each day (T) in minutes in a day. Then total flow from the sprinklers in litres = NCT in a day. Please note that the time of application of water in a day depends on several parameters like type of lawn plant, water table, ground slope, type of soil, conveyance loss etc. The area of lawn (in sq.m) irrigated, type of plant used in the lawn, capacity of tank used for storing the treated water etc may also be informed. Water meter may be installed in the gardening/toilet flushing lines for the purpose of verification.

25.All ETP's shall have water meters & separate energy meters.

26.Hotels with lodging facilities shall have full-fledged ETP. Food waste generated shall be disposed through bio-gas plant/compost system/organic waste converter.

27.The quality of treated effluent shall be as follows:

Parameter	unit	limit
pH	-	5.5-9
BOD (3 day 27 ⁰ C)	mg/l max	30 maximum
Oil & Grease	mg/l max	10 maximum
Total suspended solids	mg/l max	100 maximum

For reuse for toilet flushing, BOD permissible is 3 mg/l only.

28.The units shall submit treated effluent monitoring report once in a month and report submitted to the Board. The Board officials shall maintain a consolidated list of hotels, restaurants and auditoriums and separately mark those having ETP's and shall conduct surprise check of these units and also collect samples of trade & treated effluent for analysis. A time target may be fixed to complete inspection of all these units and may be got approved by the concerned regional heads in advance.

29.All Auditoriums shall have facilities as mentioned under Para 18-20.

30.Plastic waste generated shall be segregated, cleaned and stored separately. It shall be disposed through local bodies or authorized agencies.

31.Hotels of category 3 star and above shall have dual plumbing system for using recycled treated sewage, which saves on consumption of fresh water

from municipal supply or ground water. A grace period of 6 months may be provided for implementing the same if not already implemented. Various types of sensor based technologies along with low flow devices (solenoid self operating valves) shall be used for urinals, taps in wash basins. Low flush cisterns working on 3 & 6 litres/ flush shall be used instead of conventional 12.5 litres.

32.Solar systems & LED bulbs shall be encouraged. DG sets shall be provided with acoustic enclosure with exhaust height as per specifications.

33.For rain water harvesting, the runoff (volume of rain water that can be harvested) is calculate using the formula, $Q = CIA$

→Q is the rain water that can be harvested in m^3/h (cubic metre per hour), C is the runoff coefficient, I is the rainfall intensity in mm/h (millimeters per hour) and A is the surface area of the harvesting area in m^2 (square metre). Surface area that can be utilized for harvesting includes roof/terrace area, paved & unpaved surfaces. Rainwater thus harvested shall be discharged into recharge pits if the site is not a water logged area. The number of recharge pits required have to be correctly assessed based on the maximum quantity of water likely to be harvested. However in cases where there are space constraints, rain water collection tanks may be provided.

34.Storm water drains have to be designed in such a way that no waste water enters the storm water.

35.DG sets shall be installed as per norms of the Board.

**Sd/-
CHAIRMAN**

FORWARDED/BY ORDER

SENIOR ENVIRONMENTAL ENGINEER - 3