SOP for ZLD verification of distilleries under the “Scheme for extending financial assistance to project proponents for enhancement of their ethanol distillation capacity or to set up distilleries for producing 1st Generation (1G) ethanol from feed stocks such as cereals (rice, wheat, barley, corn & sorghum), sugarcane, sugar beet etc.”

Contents

1. Introduction

The Central Government with a view to increase production of ethanol and its supply under Ethanol Blended with Petrol (EBP) Programme, especially in the surplus season and thereby to improve the liquidity position of the sugar mills enabling them to clear cane price arrears of the farmers notified the scheme namely "Scheme for extending financial assistance to sugar mills for enhancement and augmentation of ethanol production capacity" vide notification No. S.O. 3523(E), dated 19.07.2018, which was subsequently amended vide notifications No. S.O. 3952(E), No. S.O. 5219(E), No. S.O.47 (E), No. S.O. 4104(E) and No. S.O. 1523(E) dated 09.08.2018, 11.10.2018, 04.01.2019, 14.11.2019 and 20.05.2020 respectively. Thereafter schemes for extending financial assistance to sugar mills & molasses based standalone distilleries for enhancement and augmentation of ethanol production capacity were notified on 08.03.2019 vide notifications No. S.O. 1227(E) & S.O. 1228(E). Further vide notifications No. S.O. 3135(E) & S.O. 3136(E) dated 15.09.2020, a small window was opened for 30 days for inviting applications under the scheme from molasses-based standalone distilleries and from sugar mills.

Now, the Central Government vide notification no. **S.O. 148 (E)** dated 14.01.2021 notifies the modified scheme namely- "Scheme for extending financial assistance to project proponents for enhancement of their ethanol distillation capacity or to set up distilleries for producing 1st Generation (1G) ethanol from feed stocks such as cereals (rice, wheat, barley, corn & sorghum), sugarcane, sugar beet etc."

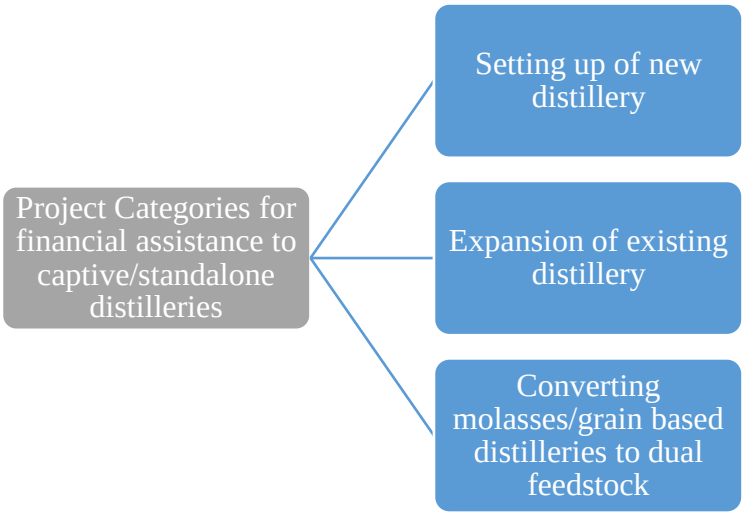
2. Objective of Standard Operating Procedure (SOP)

The main objective of the current SOP is to streamline & strengthen the mechanism of issuing ZLD certificate to the applicant entrepreneur/sugar mill/distillery unit. This will help the units to produce requisite documents for issuance of ZLD certificate which is mandatory for availing the scheme. SOP will maintain uniformity in the assessment process, save time and also expedite the certification process.

3. Project categories for financial assistance

Assistance under the scheme shall be available to the entrepreneurs for following project activities:

1. Setting up grain-based distilleries/expansion of existing grain-based distilleries to produce ethanol. However, benefits of interest subvention scheme are to be extended to only those distilleries which are using or will be using dry milling technique to produce Dry Distillers Grain Soluble (DDGS).
2. Setting up new molasses-based distilleries/expansion of existing distilleries (whether attached to sugar mills or standalone distilleries) to produce ethanol and for installing any method approved by Central Pollution Control Board for achieving Zero Liquid Discharge (ZLD).
3. To set up new dual feed distilleries or to expand existing capacities of dual feed distilleries.
4. To convert existing molasses-based distilleries (whether attached to sugar mills or standalone distilleries) to dual feed (molasses and grain/ or any other feed stock producing 1G Ethanol); and also, to convert grain-based distilleries to dual feed.
5. To set up new distilleries / expansion of existing distilleries to produce ethanol from other feed stocks producing 1G ethanol such as sugar beet, sorghum, cereals etc.
6. To install Molecular Sieve Dehydration (MSDH) column to convert rectified spirit to ethanol in the existing distilleries.



4. Intervention of expert committee

To avail the facility for financial assistance, government made it mandatory for all concerned entrepreneur/sugar mill/distillery to submit a certificate duly verified by the Central Pollution Control Board (CPCB) certifying that zero liquid discharge (ZLD) has been achieved through the method proposed at the time of submitting application to the

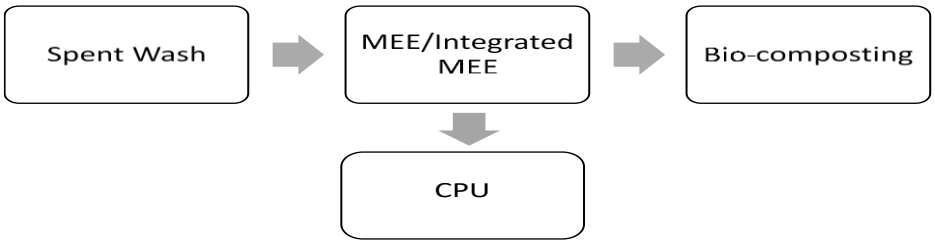
Department of Food and Public Distribution (DFPD) for such purpose. CPCB vide office order dated 30.07.2021 constituted an expert committee comprising of officials from Department of Food and Public Distribution (DFPD), Ministry of Consumer Affairs, Food and Public Distribution, CPCB, IIT Roorkee, Vasandada Sugar Institute (VSI), National Sugar Institute (NSI) and Indian Sugar Mills Association (ISMA) for examination and recommendation of proposals received from industrial unit.

5. Zero Liquid Discharge (ZLD) system

ZLD refers to installation of facilities and system which will enable industrial effluent (all stream) for absolute recycling of or re-use in to industrial process and converting solute (dissolved organic and in-organic compounds / salts) into residue in solid form by adopting method such as concentration/ evaporation/drying. ZLD will be recognized and certified based on two broad parameters that is, water consumption versus waste water reused or recycled (permeate) and correspondingly solids recovered (percent total dissolved / suspended solids in effluents)".

CPCB does not prescribe any technology for achieving ZLD. **Few examples** of prevailing practices for effluent treatment for achieving ZLD by molasses and grain-based industries are figured below;

Fig. 1: ZLD scheme for molasses-based distilleries



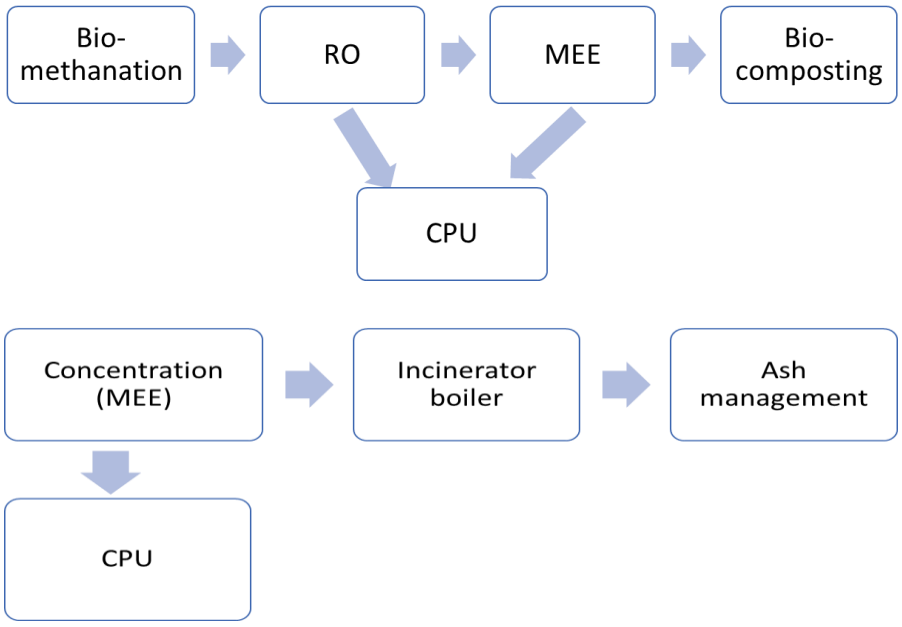


Fig. 2: ZLD scheme for grain-based distilleries

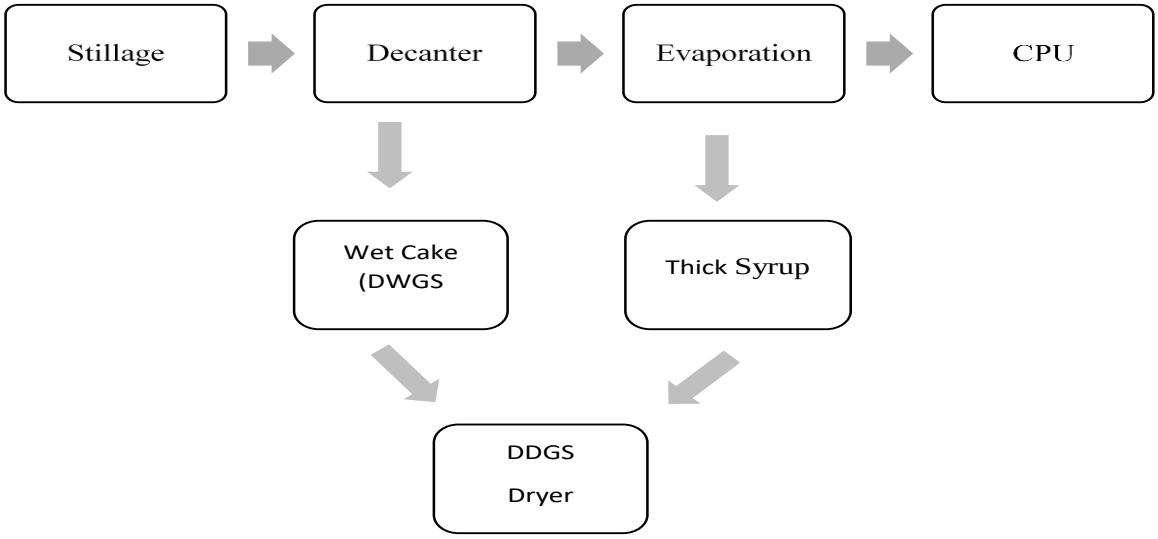
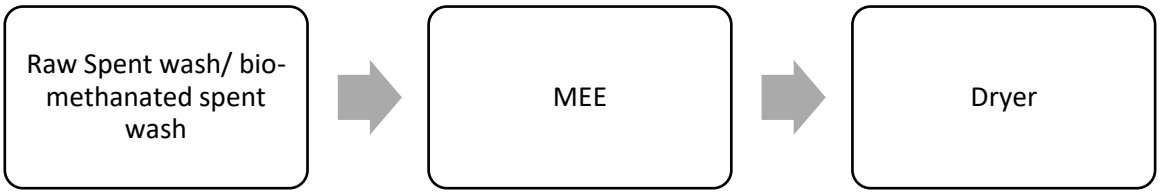


Fig. 3: ZLD scheme for distilleries opting dryer



6. Conditions for verification of ZLD for certification purpose

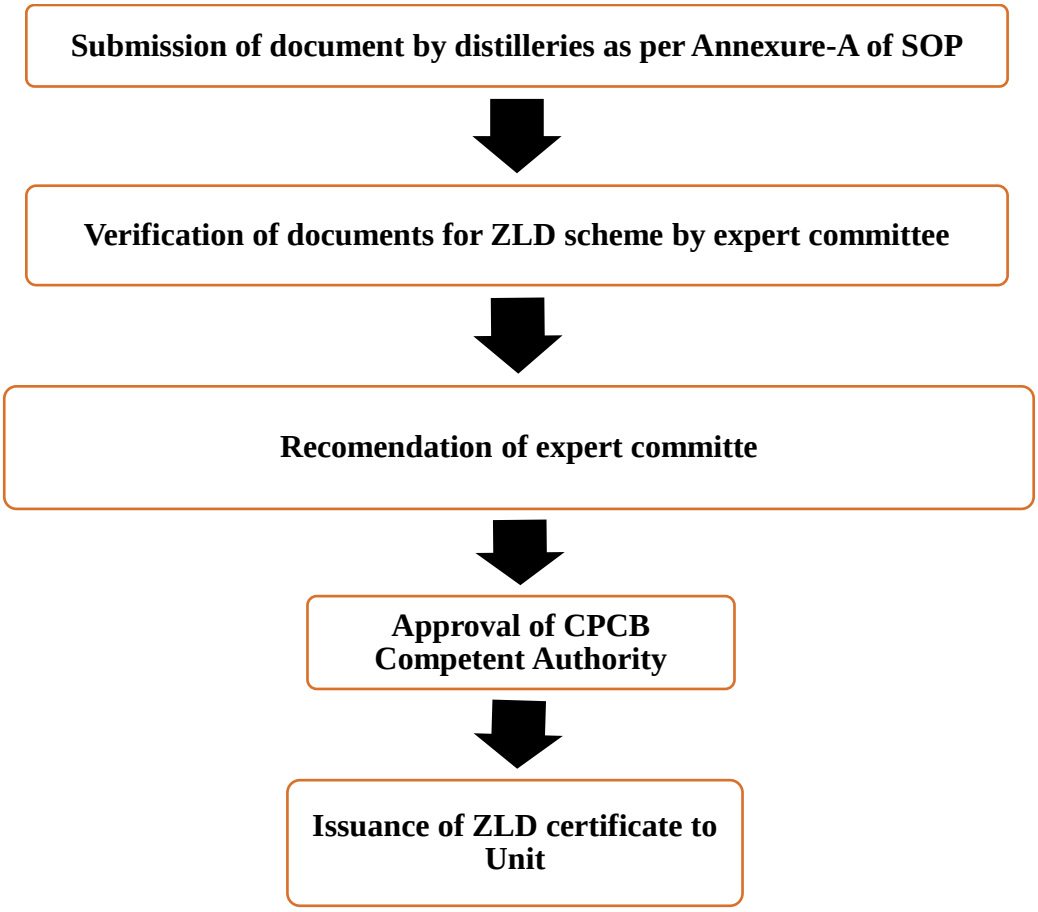
It is mandatory to all the concerned entrepreneur/sugar mill/distillery to fulfill the following conditions before applying for review process;

- ✓ Project proponent has obtained Environmental Clearance (EC) from concerned authorities
- ✓ Project proponent has obtained valid consent to establish (CTE) and consent to operate (CTO) from concern SPCBs.
- ✓ Installation of project activity for new/expansion has been finished. Only fully commissioned project will be considered for review.
- ✓ Certificate duly verified by the Excise Commissioner of the State concerned and the Chartered Engineer certifying respectively that the new distillery has commenced production and has been installed or expansion of the existing distillery has been completed and enhanced production of ethanol has commenced.
- ✓ Installation of OCEMS systems & their connectivity with CPCB/SPCB servers.
- ✓ Installation of ZLD systems for the treatment of spent wash.
- ✓ Installation of Condensate Polishing Unit (CPU) or other appropriate technology for treatment of evaporation condensate, RO reject, spent lees, and other non-process low strength effluents.
- ✓ Details of plant process machinery & ZLD system duly certified by SPCB/ Excise commissioner

✓ Submission of documents by the unit as per Annexure-A.

7. Assessment process

Expert committee has formulated the assessment process to maintain uniformity and transparency for examining the proposals received from Sugar/Distillery units and timely grant/issuance of ZLD certificate to the applicant units.



8. Collection of information for certification of ZLD

Effluent generation & characteristics in distilleries greatly varies depending upon the raw material utilised for the fermentation & subsequent ethanol production. Similarly, ZLD scheme for recycling of effluent also varies depending on the characteristics of generated effluent. Compliance of following conditions shall to be ensured by units;

A. For Molasses Based Industries

a) ***Industries opting for bio-composting***

✓ It should result in Zero Liquid Discharge.

- ✓ Valid air/water/hazardous waste consent from SPCB & NOC from CGWA for ground water extraction or valid application
- ✓ Maximum storage of spent wash utilized in bio-composting shall strictly be restricted to thirty days equivalent of volume of spent wash allowed for the use for bio-composting (e.g. thirty days equivalent of 40- 45% by volume of spent wash generated with minimum 25-30% solid concentration utilized in bio-composting in five Ganga main stem states). Excess storage facilities beyond this shall be levelled and dismantled.
- ✓ Lagoons used for storage of concentrated spent wash should be properly lined and made impermeable.
- ✓ Strict compliance to 'Standard operating procedure (SOP) for Bio-composting operation for Molasses based distilleries.
- ✓ For 5 to 12 % solids containing spent wash, the filler material (PMC) to spent wash ratio prescribed is 1: 2.5 for 45 days cycle and 1:3.5 for 60 days cycle.
- ✓ For concentrated spent wash (20 to 30 % solids), the filler material (PMC) to spent wash ratio prescribed is 1: 1.6 for 60 days cycle.
- ✓ The unit should have installed OCEMS as per CPCB directions (i.e. web PTZ camera at bio-compost yard and lagoons, and flow meters at raw spent wash generation point and at MEE outlet).
- ✓ Both cameras and flow meters to be connected with SPCB/CPCB Servers.
- ✓ The unit should install mass flow meter with totalizer at the inlet and outlets (Condensate & concentrate) of MEE

b) ***Industries opting for incinerator boiler/ Dryer***

- ✓ It should result in Zero Liquid Discharge.
- ✓ Valid air/water/hazardous waste consent from SPCB & NOC from CGWA for ground water extraction or valid application
- ✓ Minimum Solid % in feed for slop fired incinerator shall be 45%.
- ✓ Maximum storage of raw spent wash utilized in MEE followed by incineration shall strictly be restricted to seven days equivalent of concentrated spent wash generated. Excess storage facilities beyond this shall be levelled and dismantled.

Or other direction/ condition approved by concerned SPCB or CPCB in this regard for volume reduction & restriction of storage capacity of concentrated spent wash.

- ✓ Lagoons used for storage of raw spent wash should be properly lined and made impermeable.
- ✓ The boiler should run at the rated capacity and at rated ratio of concentrated spent wash to subsidiary fuel.
- ✓ The incineration boiler should have installed necessary emission control system and should achieve the prevailing norms of boiler emissions.
- ✓ The boiler should have installed on-line stack monitoring system.
- ✓ The boiler cleaning frequency and cleaning duration should be minimum.
- ✓ The unit should have proper mechanism for handling & disposal of generated ash & record shall be maintained for the same.
- ✓ The unit should have proper disposal of fermenter and CPU sludge.
- ✓ The unit should have installed OCEMS as per CPCB directions (i.e. web PTZ camera at lagoons, and flow meters at raw spent wash generation point and at MEE outlet).
- ✓ Both cameras and flow meters to be connected with SPCB/CPCB Servers.
- ✓ The unit should have installed mass flow meter with totalizer at the inlet and outlet of MEE.

B. For Grain based industries

- ✓ It should result in Zero Liquid Discharge.
- ✓ Valid air/water/Hazardous waste consent from SPCB & NOC from CGWA for ground water extraction or valid application.
- ✓ Distilleries shall have dry milling technique only to produce Dry Distillers Grain Soluble (DDGS).
- ✓ Decantation, concentration by evaporation (MEE) and drying to produce DDGS with 10% moisture content.
- ✓ Other non-process effluent, RO permeate, MEE condensate etc. shall be suitably treated and reused in the process; and shall not be discharged.
- ✓ 100% utilization of generated stillage
- ✓ The unit should have proper disposal of fermenter/ yeast and CPU sludge.
- ✓ The unit should have installed OCEMS as per CPCB directions (i.e. web PTZ camera at DDGS dryer, and flow meters at stillage generation point and at MEE outlet).
- ✓ Both cameras and flow meters to be connected with SPCB/CPCB Servers.
- ✓ The unit should have installed mass flow meter with totalizer at the inlet and outlet of MEE.

9. Rules & Regulations

The applications submitted for the ZLD certification shall consider the following rules and regulations:

- Application for fully commissioned units will be reviewed only.
- Unit has to provide minimum one-month operational data for review along with others requisite documents.
- Certificate provided will only be utilized for availing the financial assistance scheme and can’t be produced for other purposes.

Annexure-AI: List of documents for Molasses based distillery (Composting scheme)

1. Details of raw material used with quantity & production data duly certified by excise office.
2. Details of plant process machinery & ZLD scheme unit wise duly certified by SPCB/ Excise commissioner
3. Details of ZLD plant including design details of MEE, Condensate polishing units with details of treated effluent recycling/ reuse status with quantum, metering facility
4. Details of installed cooling towers with design capacity, recirculation rate, makeup water source & consumption data, blowdown frequency & quantity.
5. Details of bio composting facility;
   - Details of lagoons for storage of raw & concentrated spent wash
   - Production data of bio-compost and analysis report thereof,
   - Total area for bio-composting; total covered/ uncovered area, active area for press mud and ready bio-compost storage.
   - Quantity of Spent wash and Press mud used for bio-composting with mixing ratio.
   - Total number of cycles per annum (4 or 5)
6. Copy of Valid documents:
   - Environment Clearance
   - Consent to establish under Air/Water Acts
   - Consent to operate (CTO) under Air/Water Acts
   - Haz. Waste authorization
   - CGWA permission or valid application for seeking permission
   - Compliance status of all the conditions of CTOs under Air/Water Acts
   - Registration of OCEMS with CPCB/SPCB servers.
   - Certificate duly verified by Chartered Engineer and Excise Commissioner of the State concerned regarding commencement of distillery operation & ethanol production.
   - In principle approval copy from DFPD along with copy of proposal submitted for such purposes as per DFPD notification (Annexure 1 of notification)
7. Water balance diagram for current production- water requirement (KLD) in various departments, effluent generation and disposal/utilization quantities (KLD).
8. Material and mass balance of distillery plant operations including ETPs showing ZLD.

Annexure-A-II: List of documents for Molasses based distillery

(For incinerator or dryer scheme)

1. Details of raw material used with quantity & production data duly certified by excise office.
2. Details of plant process machinery & ZLD scheme unit wise duly certified by SPCB/ Excise commissioner
3. Details of ZLD plant including design details of MEE, Condensate polishing units with details of treated effluent recycling/ reuse status with quantum & metering facility.
4. Details of installed cooling towers with design capacity, recirculation rate, makeup water source & consumption data, blowdown frequency & quantity.
5. Details of incineration boiler/dryer with type & design capacity, feed ratio, loading rate, ash management (Ash generation rate & disposal methods) etc.
6. Details of lagoons for storage of raw & concentrated spent wash viz. numbers & storage capacity.
7. Copy of Valid documents:
   - Environment Clearance
   - Consent to establish under Air/Water Acts
   - Consent to operate (CTO) under Air/Water Acts
   - Haz. Waste authorization
   - CGWA permission or valid application for seeking permission
   - Compliance status of all the conditions of CTOs under Air/Water Acts
   - Registration of OCEMS with CPCB/SPCB servers.
   - Certificate duly verified by Chartered Engineer and Excise Commissioner of the State concerned regarding commencement of distillery operation & ethanol production.
   - In principle approval copy from DFPD along with copy of proposal submitted for such purposes as per DFPD notification (Annexure 1 of notification)
8. Water balance diagram for current production- water requirement (KLD) in various departments, effluent generation and disposal/utilization quantities (KLD).
9. Material and mass balance of distillery plant operations including ETPs showing ZLD.

Annexure-A-III: List of documents for Grain based distillery

1. Details of raw material used with quantity & production data duly certified by excise office.
2. Details of plant process machinery & ZLD scheme unit wise duly certified by SPCB/ Excise commissioner
3. Details of ZLD plant including design details of decanters, DWGS dryer, evaporation units (MEE) Condensate polishing units (CPU) with details of treated effluent recycling/ reuse status with quantum, metering facility.
4. Details of installed cooling towers with design capacity, recirculation rate, makeup water source & consumption data, blowdown frequency with quantity etc.
5. Details of production data of whole stillage, thin stillage, syrup, wet cake, DWGS & DDGS and analysis report thereof.
6. Copy of Valid documents:
   - Environment Clearance
   - Consent to establish under Air/Water Act
   - Consent to operate (CTO) under Water Act
   - Consent to operate (CTO) under Air Act
   - Haz. Waste authorization
   - CGWA permission or valid application for seeking permission
   - Compliance status of all the conditions of CTOs under water act and air act
   - Registration of OCEMS with CPCB/SPCB servers
   - Certificate duly verified by Chartered Engineer and Excise Commissioner of the State concerned regarding commencement of distillery operation & ethanol production.
   - In principle approval copy from DFPD along with copy of proposal submitted for such purposes as per DFPD notification (Annexure 1 of notification)
7. Water balance diagram for current production- water requirement (KLD) in various departments, effluent generation and disposal/utilization quantities (KLD).
8. Material and mass balance of distillery plant operations including ETPs showing ZLD