

**BEFORE HON'BLE NATIONAL GREEN TRIBUNAL WESTERN ZONE  
BENCH AT PUNE**



Original Application No. 69 of 2022 WZ.

&

Original Application No. 114 of 2023 WZ.

Sunil Pharate

..... ) Applicant.

**VERSUS**

State of Maharashtra & Others.

..... ) Respondents.

**Index**

Sr. No.	Annexures	Particulars of Documents	Page No.
1	Counter-Reply to the Compliance Affidavit of the MPCB of January 2025	--	1630 to 1638
2	Annexure – A collectively	Photographs and Documentary Evidence about expenditure incurred on recycle/reuse of treated effluent of sugar-industry	1639 to 1642
3	Annexure – B	Documentary evidence about replacement of atmospheric distillation system with multi pressure distillation system guideline of CPCB	1643 to 1651
4	Annexure – C	Restricted existing capacity of lined Spentwash	1652 to 1653



		storage lagoons as recommended by the authorities from time to time. Sugar and Distillery Flow Chart of Effluent Generation and Utilization - Documentary Evidence.	
5	Annexure – D	The coloured photographs of the De-Sludge work completion.	1654
6	Annexure – E	Photographs of Completion of work of reclamation of unlined lagoons and to utilize for pumping arrangements	1655



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**COUNTER AFFIDAVIT TO THE COMPLIANCE-AFFIDAVIT FILED BY R.N.8 & 16 IN  
OA NO 69 OF 2022**

I, Mr.Pandit Shivajirao Patil, Managing Director In-charge of M/s Yashwantrao Mohite Krishna SSK Ltd, Karad an Authorized Signatory of the Respondent No. 8 & 16 in O.A. No. 69 of 2022 & by R.N. 1 in the O.A. No.1 is filing this Counter Affidavit to the Compliance-Affidavit filed by & on behalf the MPCB, i.e. the R.N.2 only with a limited purpose of bringing on record that the R.N.2 has not filed on record the Compliance in respect of the exact period for which the violation was committed; the evidence with respect to violation has to be adduced along-with the pagination in order to facilitate this Tribunal to arrive on a conclusion as directed by this Hon'ble Tribunal vide Order dated 06th September 2024. No specific date-wise violations are given except reference of the Joint Committee Report & Certain communications like Visit Report followed by the Proposed Directions & Other Communications without supported by JVS & Other Documentary Reports. The following are the submissions of the R.N.8 & 16 in the O.A. No.69 of 2022 & O.A. No.114 of 2023 respectively.

The O.A. No.69 of 2022 was filed about pollution of River-Krishna by discharge of untreated effluent into the said river by several industries situated near Mauje-Digraj, Palus to Sangali area in District Sangali & news appeared about the death of fishes & damage to bio-diversity stated to be affected due to untreated effluent being discharged into the said river. The R.N.2 has relied upon the Joint



Committee Report about which the following are the submissions of the Respondent-  
YM Krishna SSK Ltd (Sugar & Distillery Industries)

- 1) In its Report submitted by the Joint Committee on 13-11-2022 in compliance of the Order passed by this Hon'ble Tribunal dated 24th August 2022, it has been specifically observed that the during the joint committee inspection both of the sugar-industry & distillery units were not in operation due to non-crushing season & as per the Form R.T. 8 (C) i.e. the Final Manufacturing Report for the Crushing Season 2021-22 (Central Excise Rule 83) submitted to the Commissioner of Sugar, Cane Crushing for the said season started w. e. from 27-10-2021 & end date was 30-04-2022 (Total days of operation were 186) [Page-37 of 56 of J C Report (Last- Para)] & [Page- 38 of 56 of J.C. Report (First-Para).
- 2) The J.C. has further specifically observed that the Sugar-industry in compliance of the Schedule-I (D) of Consent to Operate dated 27-12-2021 provided ETP of Primary, Secondary & Tertiary Treatment System for the treatment of process effluent & also executed a bilateral agreement with the farmers for discharge of treated effluent for irrigation on 150 acres of own agricultural land & also on shareholders land as well as 56 acres of nearby agricultural land. The list of farmers with the bilateral agreements submitted to the MPCB has been made available to the Committee.

Sugar-industry has provided 15 days treatment storage tank of 12,500 CMD (Lined) to take care of no demand for irrigation as per CREP- Conditions stipulated in the Consent.

- 3) It is further reported that the Sugar-industry has also provided online continuous monitoring system (OCEMS) at the final treated effluent conveyance pipeline/final outlet for monitoring parameters viz. pH, TSS, COD, BOD & Flow in compliance to the CPCB-Directions dated 05-02-2014 & the Revised Guidelines for OCEMS.
- 4) The J.C. further refers to the Analysis of Grab Samples collected by the MPCB from the Bypass line of ETP on 07-01-2020 & 03-02-2021 having higher BOD & COD concentration. At the most the EDC can be imposed only for the specific days and dates on which the parameters prescribed by the MPCB were exceeding.
- 5) Therefore, the J.C. recommended the MPCB to direct the Sugar-industry to submit time-bound action plan for implementing to carry-out adequacy assessment report of the existing ETP through a reputed govt institute/Govt Engineering College & augment the ETP so as to achieve MPCB-Discharge



Standards. Further recommended to direct providing of CPU to recycle/reuse of treated effluent in compliance of Schedule-I (1-B) Consent Conditions.

The Respondent – Sugar Industry in Compliance of Joint Committee Recommendations has taken following steps to comply with the J.C. Report.

- 5.1) The R.No.8 & 16 had engaged the Government Collage of Engineering, Karad to prepare the Feasibility Report of ETP and Air pollution Control System. Earlier the R.No.8 & 16 had enclosed Annexure-II collectively at pages 421 to 424 enclosed to the affidavit in response to the J.C. Report dated 24.08.2023. The treatability study with Feasibility Report of ETP and Air pollution Control System is already enclosed to the earlier affidavits in-reply to main application as well as with regard to Joint Committee Report in Counter Affidavit to the Additional Affidavit of the applicant dated 5/02/2024 at Annexure – R-4 & 5, at pages 107 to 124, which is self-explanatory.
- 5.2) The sugar industry has provided arrangements for recycle/reuse of treated effluent. Industry has installed integrated water reuse system therein maximum water cool and reuse for the process. The Photographs & Documentary Evidence about its expenditure incurred and provided it are enclosed & marked as an **Annexure- A collectively**.
- 5.3) Unlined Lagoons Scrapping Process – The process of scrapping of unlined lagoons is continuous process, but no treated/untreated/under treated effluent discharged by the R.No.8 & 16 in the said lagoons. It was fairly stated in reply to the Proposed Direction dated 23.07.2022 that due to heavy rains some of the rain water was getting mixed on the empty compost yard ground and lagoons and therefore having slight coloured with pH- 7.5 as per reply submitted to the proposed direction dated 27.07.2022 (Annexure III at pages 425 & 426) of the affidavit dated 24.08.2023 submitted in response to the Joint Committee Report dated 13.11.2022.
- 5.4) Compliance of various proposed directions, interim directions made by the R.No.8 & 16 as under-
  - a) The complaint was made by the applicant on 8.08.2023 of which reply was given by the SRO-Sangali and complaint was transferred to SRO-Satara. The Field Officer of the SRO-Satara had investigated the complaint and submitted report to the concerned officer at Kolhapur. The proposed directions were issued by the MPCB on 23.05.2022 pointing out various non-compliances. The R.No.8 has submitted point wise reply dated 27.07.2022, which is already enclosed at an Annexure – R-5 which is at pages 563 & 564.



b) Thereafter interim direction issued by the Regional Officer MPCB, Pune as per the proposal submitted by the Sub-Regional Officer MPCB, Pune-2 (Page 271 of JC Report & Pahe 50 of OA). The compliance of the said interim directions was submitted on 09.6.2022 (Pages 566-567) in counter affidavit submitted by the R.No.8 & 16.

Thus, the compliance in respect of the proposed directions and interim directions was reported by the R.No.8 & 16.

6) Submissions about the Joint Committee's observations in its report in respect of Yashwantrao Mohite Krishna SSK Ltd. (Distillery Unit) at post Shivnagar, Taluka- Karad, District- Sangali made following observations-

- 6.1) Distillery Effluent Management – J.C. has observed that the distillery has provided ETP comprising of Bio-Digester followed by MEE and Bio-Composting. The Distillery was in operation for the season 2021-22 with effect from 23.10.2021 till 10.06.2022 (total 220 days) as per Excise-Statement.
- 6.2) Joint Committee had referred MPCB-Surveillance – Inspection Report dated 13.07.2022 after the day of Fishkill incidence reported at river Krishna and sampling done by the MPCB at bypass pipeline located at down streams of the distillery and natural drain. (Kole nallah). The analytical reports of samples collected on bypass line of the distillery and Kole Nallah reproduced showing exceeding parameters of BOD, COD etc. Certain photographs are enclosed in the support of bypass and contaminated water.
- 6.3) Joint Committee collected samples from Kole Nallah on 30.09.2022 upstream location of old spent wash storage lagoons. The analytical reports which are exceeding can be very well taken into consideration for the purpose of assessment of EDC.

The Joint Committee has referred the analysis results of bypass line of distillery and water samples from natural drain collected on 13.07.2022 (Page 42 of 56 of the report) and analysis results of spent wash contaminated water, spent wash and natural drain collected on 30.09.2022. (Upstream location of Kole Nallah and downstream location of Kole Nallah of old spent wash storage lagoons).

- 6.4) Joint committee has taken on record compliance of Schedule - I (1A) of CTO dated 27.12.2021 in respect of Bio-Digester followed by MEE and Bio-Composting with 2 Nos of lined spent wash storage lagoons as per consent conditions.
- 6.5) Joint Committee therefore recommended to the Distillery-Unit the following steps to be taken –



- a) Provide adequate capacity of MEE for which the following compliance-steps are taken:

The fermented wash after yeast decantation is taken to distillation system. The old atmospheric distillation system is replaced with multi pressure distillation system. In this process RS/ Ethanol is produced. By converting from atmospheric distillation to multi pressure the quantity of spent wash generation is the fermented wash after yeast decantation is taken to distillation system. The old atmospheric distillation system is replaced with multi pressure distillation system. In this process RS/ Ethanol is produced. By converting from atmospheric distillation to multi pressure the quantity of spent wash generation is reported to have been reduced from 920 m<sup>3</sup> / day to 855 m<sup>3</sup> / day also we are using sugar syrup to ethanol distillation quantity is reduced up to 600 m<sup>3</sup>/day. Generated Spentwash using for bio-methanation followed by composting and maximum generated Spentwash using for composting and archive to zero discharge. Further following recommendations made by the Joint Committee.

- b) The Government Authorised Institute and National Sugar Institute guidance taken to execute the work to replace atmospheric distillation system with multi pressure distillation system as stated above. Guidelines of Central Pollution Control Board refer to page no-9 Table no 3 point No -3 and Government-Authorised Agencies enclosed and marked as an **Annexure - B**.

- c) Restrict the existing capacity of lined spent wash storage lagoons to total concentrated spent wash generation rate of 310 CMD instead of 720 CMD Bio-methane spent wash generation.

The R.No.8 & 16 have due to installation of MEE and further improvement therein by way of concentration Spentwash generation and reduction from time to time restricted the existing capacity of lined Spentwash storage lagoons as recommended by the authorities from time to time. Sugar and Distillery Flow Chart of Effluent Generation and Utilization is enclosed and marked as an **Annexure C**.

- d) De-sludge the accumulated sludge from the existing lined spent wash storage lagoons and the sludge shall be managed in existing sludge-drying beds of ETP.

Generally, accumulated sludge de-sludge and used for composting. The De sludge work is already completed long back and collected sludge sent to the composting as per the MPCB-Guidelines. The coloured photographs of such work completion are enclosed and marked as an **Annexure D**.

- e) To submit a time bound action plan to scrap and level old unlined spent wash storage lagoon and to installed piezometric wells



around the old unlined spent wash storage lagoon for monitoring ground water quality. It is submitted that the two unlined-lagoons are scraped long back and are being totally reclaimed, which can be seen from the photographs thereof. The third unlined-lagoons being connected by pumping system of which photograph/s is enclosed. The copies of photographs and pumping station are enclosed and marked as an **Annexure E**.

- f) Piezometric wells will be installed only after taking necessary permission from the nearby farmer because there is no suitable place to provide piezometric well within the lagoon area premises on account of on one hand is having the canal, on the second hand is having another lined lagoons/storage tank and on the third side there is road, where it cannot be provided.
- 7) The R.No.16 would like to submit the following details in respect of Fishkill incidence – The Respondent distillery already stated in its reply dated 27.07.2022 that there were heavy rainfalls in that week and some of the rain water was getting mixed on the ground/empty compost yard and lagoons. Therefore, the water flow having slight colour and pH noted by the Field Officer was also 7.5, however, the mixing of rainwater through nallah was having very much dilution. But the Fishkill incident was about 40 km away from the nallah and during the visit all the manufacturing activity of the distillery and sugar industry was not in operation and none of the effluent was stored in any of the lagoon or pond. (Page 425-431). Whatever direction were issued by the MPCB dated 19.01.2023 in continuation of earlier proposed direction dated 22.06.2022 and reply thereto 27.07.2022, it can be seen that those directions are issued only with a view to take precautionary measures and do not point out any specific damage cause to the nearby environment. Directions are about not to discharge leachate/effluent into nearby nallah, to clean-up compost yard. The bank guarantee of Rs. 1,50,000/- has been forfeited for exceeding results at the time of issuance of interim directions. No were the Fishkill was referred therein which was occurred after season of the distillery and sugar was over. Therefore, imposition of EDC for 388 days for which period neither distillery nor sugar industry was in operation is not tenable. [Page 495 Para 4 of Affidavit dated 08.1.2024 (Counter Affidavit to additional affidavit of the applicant received on 28.11.2023)].
- 8) The distance of Nallah from the factory is 3 Km and admittedly the Fishkill spot is at about 40 Km and therefore by no stretch of imagination the effluents from R.No.8 & 16 can be stated to be reaching the Fishkill spot.
- 8.1) In fact, the distillery in particular after Fishkill – season not operated more than 198 days and therefore no question of excess production arises. The distillery has already provided ZLD arrangements.



- 8.2) The distillery has adopted Multi-Pressure-Distillation Re-boiler, Bio-methanation Plant, MEE and Bio-composting. There was no possibility of reaching effluent or even overflow of compost pit runoff to the nearby nallah at a distance of 3 Km or very remote place of Fishkill at a distance of about 40Km. During the visit dated 14.07.2022 there was not found any dead fish incident at Khubi Nallah where the MPCB official had visited.
  - 8.3) The R.No.8 & 16 have collected accumulated sludge from the existing lined spent wash storage lagoons and mixed with the composting and compost is sold.
  - 8.4) The Piezometer Well has been installed before start of next crushing season provided the nearby farmer permits to provide it in his farm. (Page 418 of affidavit in response to Joint Committee Report).
- 9) The R.No.2 has shown the period of violation from 13.07.2022, when the discharge is alleged to be observed up to 05.08.2023 when again the alleged discharge is stated to be observed, thereby assessing EDC for 388 days as per Page 482. But nowhere exact days of violation with specific violations date-wise have been given by the R.No.2 and therefore the R.No.1 has filed its counter affidavit to the additional affidavit of the applicant at pages 491 to 617 dated 08.01.2024.

Thereafter, this Hon'ble Tribunal by its order dated 06.09.2024 it was specifically pointed out that the Respondent-MPCB should bring on record the evidence to show that the violations were continued by the above-mentioned industry for the aforesaid periods, but no evidence could be shown by the MPCB and therefore it was agreed to bring on record the specific date-wise evidence about violations. However, no such specific date-wise violations duly supported by documentary evidence is brought on record by the MPCB in the OA No. 114/2023, which was filed by the applicant. Subsequently. Hence, the MPCB has not assessed any EDC in OA No. 114/2023. Even during the course of hearing later on given on 18.04.2024 for the assessment of EDC, as per Order passed by this Hon'ble Tribunal dated 15.02.2024, the MPCB has not reviewed assessment of EDC for 388 days inspite of the facts that the R.No.8 & 16 never operated for 388 days for which EDC has been assessed. Hence, the assessment of EDC given at page 482 & 483 of the report on Environmental Compensation to be levied on the R.No.8 & 16 without any specific documentary evidence and also date-wise violation cannot be taken into consideration. Therefore, the assessment of EDC without adducing any specific date-wise violations duly supported by substantive documentary evidence needs to be reviewed afresh.

- 10) Compliance of interim directions dated 02.06.2022 – The R.No.1 in OA No. 114/2023 has already filed a detailed affidavit in its counter Affidavit come objections to the additional reply filed by the MPCB in the OA No. 69/2022 &




OA No.114/2023 specifically submitted its reply at para 7 of the said affidavit on page 496 stating that the samples are collected by the Sub-Regional Officer, MPCB, Satara of Kole Nallah at a distance of 3 Km, and Krishna River at a distance of 40 Km away from R.No.1 on 5.08.2023 after the 2<sup>nd</sup> day when the news appeared in the Tv9. The analytical reports of samples collected by SRO Satara near lagoon, Kole nallah and Krishna river are enclosed as an Annexure R-13 to R-15 respectively (at page 605 to 612 of said Affidavit) shows COD-356 against 250 mg/l standards. Therefore, the results are not so far abnormal. The Field Officer of SRO visited on 14.07.2022 and investigated the Fishkill incident and observed that no traces of Fishkill or dead fish observed. The copy of visit report is enclosed at Annexure R-16 and R-17 respectively. (at page 613 to 616 of said Affidavit). SRO Satara, with his Field Officer again visited on 30.8.2022 and observed that there was no objectional discharge into nallah and compost yard. (Page 496 of counter affidavit dated 08.1.2024). Therefore, the objections in respect of issuance of interim directions are already taken into consideration in the verification report of Field Officer.

- 11)The R.No.8 & 16 in OA No. 69/2022 and OA No. 114/2023 at Page 492 of the Counter Affidavit dated 08.1.2024 submitted to Additional Affidavit of the Applicant at 2-vi)] that the average BOD, COD parameters of sugar and distillery are not very much exceeding and those are overall marginally exceeding only for the specific dates mentioned in the said paragraphs. Even MPCB sampling and analysis done on 7.01.2020 and 3.02.2021 form the alleged bypass of SSK are not very much exceeding. Therefore, at the most the dates shown for the exceeding parameters two dates for BOD and Seven days for COD as well as grab sampling and analysis dates 7120 and 3221 EDC can be assessed. The Respondent would like to rely upon the average online monitoring and MPCB results at Annexure – R-2 & R-3 respectively of the said counter Affidavit dated 08.1.2024 (R-2 is at pages 501 to 535 & R-3 is at pages 536 to 561). After going through the statement of analytical results of samples enclosed at Annexure-B Pages 1033 & 1034 between the period 28.10.2022 to 03.10.2023, only the results of samples of 73 days have been shown by the MPCB in its compliance affidavit dated 22.01.2025 filed by Shri. Vidyasagar Killedar, SRO, MPCB, Sangli, which are not so far abnormal. Hence, assessment of EDC for 388 days is totally unwarranted and unjustified and needs to be reviewed afresh. The Respondent therefore prays for such review of assessment of EDC afresh.

Solemnly affirmed on 04<sup>th</sup> March 2025 at Karad.

For and on behalf of the R.No.8 & 16



  
Managing Director In-charge  
M. Krishna Sahakari Sakhar Karkhana  
Id. Rethare Bk., P.O. Shivnagar-415108  
Tal. Karad, Dist. Satara



**VERIFICATION**

I, Mr. Pandit Shivajirao Patil Managing Director In-charge state that the contents paragraphs 1 to 11 of my Counter-Affidavit are true & correct to the best of my knowledge & belief. Annexure thereto is true office copy which was submitted to the MPCB.



(Signature)

Authorized Signatory.

**Authorised Person**

Y. M. Krishna Sahakari Sakhar Karkhana Ltd, Rethare Bk., P.O. Shrivnagar-415108 Tal. Karad, Dist. Satara

solemnly affirmed before me by  
Shri / Smt. P. S. Patil  
No. Y. M. Krishna Rethare Bk. Tal. Karad  
Who is identified before me by  
Shri / Smt. Self  
in whom I know Personally

**NOTED & REGISTERED**  
**TODAY AT KARAD**  
SR. No. 424/2025  
DATE :- 4 MAR 2025

**BEFORE ME**

(Signature)

ADV. ASHOK V. MOHITE  
NOTARY GOVT. OF INDIA  
KARAD, DIST. SATARA  
REGD. No. 5125



ANNEXURE A COLLECTIVELY

**Yashwantaro Mohite Krishna Sahakari Sakhar Karkhana Ltd., Rethare BK,  
Shivnagar, Karad, Satara.  
(Process condensate, Boiler condensate & mill water reuse system  
Installed & reuse system of condensate water)**





- 12 -

VAT TIN -27490000115V  
C S T TIN 27490000115C  
G S T N 27AAAAK0946L1Z1

Excise Control Code-  
AAAAK0946LXM001

Range: KARAD-V  
Commissionerate-kolhapur

Tel No - 02164 266222 /23 /24 /25  
Fax No. - 02164 266226

**YASHWANTRAO MOHITE KRISHINA SAHAKARI SAKHAR KARKHANA LTD; RETHARE BK.**

Post-Shivnagar, Tal-Karad, Dist-Satara  
E-mail ymkrisnassk@rediffmail.com, etender.ymkaskl@gmail.com

PUR -F- 04

**PURCHASE ORDER**

ORDER NO: YMK888K2023-2024/Engineering - 2/ 821 /2023-2024  
Executive Board Meeting Date - Requisition No - 1169/  
Resolution No - Club No. 829

Date: 21/07/2023  
Enq No & Date . 829 13/07/2023  
Quot No & Date 1253 21/07/2023  
Supp Quo no &Date

To,  
0277 M/S NIKS TECHNICAL SERVICES,  
1, WHITEFIELD APPRTMENT, 20,  
ASHIKNAGAR, PUNE-411007.

Tel No - 0822014385 Fax No. -  
Mo No

Subject - SUPPLY ERECTION & COMMISSIONING COOLING TOWER

Ref :- YOUR QUOTATION NO - NIKS/118/2023-24 DT- 18.07.2023

Sr No	Item Code	Particulars	Quantity	Unit	Rate per Unit	Amount
1	23596	SINGAL CELL INDUCED DRAFT COOLING TOWER ( 200 M3 / HR ) DESC CAPACITY 200M3 / HR, SIZE 3.6 MTR (L) X 3.6 MTR (W) X 4.0 MTR (HEIGHT) PERFORMANCE COOLING FROM 62 / 55 DEG.C TO 32 / 32 DEG.C FAN DIA 2100MM, 6 BLADES, ALUMINIUM, MOTOR 12.5 HP / 720 RPM	1.00	NUMBER	360750.00	360750.00
2	23594	EXCESS CONDENSATE COOLING TOWER (TWO STAGE COOLING TOWER). DESC STAGE 1  FANLESS COOLING TOWER, CAPACITY 150M3 / HR, SIZE 4 MTR DIA X 5 MTR HT PERFORMANCE COOLING FROM 75/00 DEG.C TO 52/55 DEG.C  STAGE 2  INDUCED DRAFT COOLING TOWER , CAPACITY 150M3 / HR, SIZE 3 MTR (L) X 3 MTR (W) X 3.9 MTR (HEIGHT) PERFORMANCE COOLING FROM 62/55 DEG.C TO 32/32 DEG.C FAN DIA 1800 MM, 6 BLADES, ALUMINIUM, MOTOR 10HP / 720 RPM	1.00	NUMBER	526500.00	526500.00
3	23595	SINGAL CELL INDUCED DRAFT COOLING TOWER ( 150 M3 / HR ) DESC CAPACITY 150M3 / HR, SIZE 3 MTR (L) X 3 MTR (W) X 3.9 MTR (HEIGHT) PERFORMANCE COOLING FROM 62/55 DEG.C TO 32/32 DEG.C FAN DIA 1800MM, 6 BLADES, ALUMINIUM, MOTOR 10HP / 720 RPM	1.00	NUMBER	292500.00	292500.00



Purchase Officer

Technical Co-Ordinator

G.M. Technical

MANAGING DIRECTOR

Page 1 of 2

(Shank)

26/10/24

Total Amount: 1179750.00

**TERMS AND CONDITIONS :-**

**F.O.R AT** : AT FACTORY SITE

**CGST**

106177 50CGST

**C.G.S.T**

**Delivery Period** BEFORE - 15.08.2023

**SGST**

106177 50SGST

**S.G.S.T**

**Payment** 30 % ADVANCE BALANCE AGAINST  
PROFORMA INVOICE SEND INVOICE  
WHEN MATERIAL WILL BE READY FOR  
DISHPATCH


**Others :** GUARANTEE - ONE YEAR  
WATER COOLING TEMP.MAINTAIN AS PER GIVEN NORMS IN PURCHASE ORDER

**GENERAL TERMS AND CONDITIONS :-**

1. Item-wise bill must be sent along with material, without this material will not be accepted. Supplier should send their bill in triplicate for payment.
2. Every supply should cover with our P.O.No.,Item code details etc.
3. You should be strictly follow and comply all the GST formalities within time.
4. Supplier should become 'C' class member of our karkhana by paying Rs. 100/- while accepting the purchase or job work order.
5. The material received in damaged or unserviceable condition or not as per our specification shall be rejected. Karkhana has no responsibility for rejected material.
6. Supplier has to take delivery of rejected material at their own cost within 4 days from date of supply
7. All material must be exactly as per approved samples and specification's and will be subject to our inspection and approval at any time after delivery.
8. If the material supplied are not of contract specification or otherwise not satisfactory for any reason of which the buyer shall be the sole judge. the buyer shall be entitled to reject the supplies, cancel the order and buy its requirements from elsewhere.
9. The quantity of material must not exceed without our prior written concurrence.
10. No variation of this order shall be valid unless made in writing and duly signed by both the parties. In the absence of specific written acceptance, the buyer will not be bound by any provision in the supplier's quotation, offer document or forms of acknowledgement to this order.
11. If we not receive order acceptance from your side within 2 days of receipt of our order, the order will be treated as accepted by you.
12. Any disputes that will be arise in connection with this order are subjected to satara jurisdiction only and will be subject to provisions of maharashtra co-oprative society Act 1960.
13. Fail to deliver any or all the material, Fail to complete the work within the agreed time specified in the order, suppliers shall pay liquidated damages as per karkhana rules.

  
Purchase Officer

  
Technical Co-Ordinator

  
G.M.Technical

  
MANAGING DIRECTOR

**NOTE : 1.PLEASE ENCLOSE DELIVERY CHALLAN COPY AND BILL OR INVOICE ALONG WITH MATERIAL,WITHOUT THIS MATERIAL WILL NOT BE ACCEPTED**  
**2.AS PER LATEST GST RULES, ALL THE COMPLITION FORMALITIES IN THIS ORDER MATTER SHOULD BE STRICTLY COMPLETED WITH 120 DAYS TO AVAIL GST CREDIT PLEASE NOTE OTHERWISE YOU WILL LOOSE ALL THE GST**

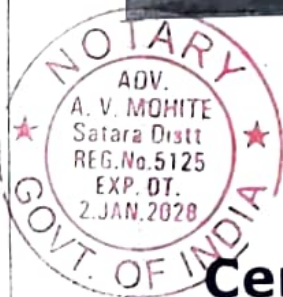
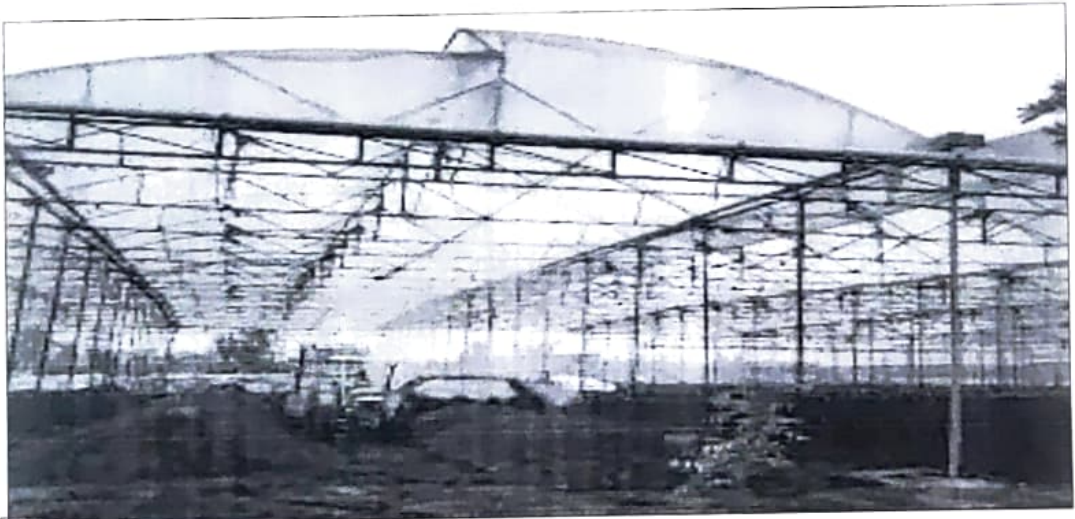
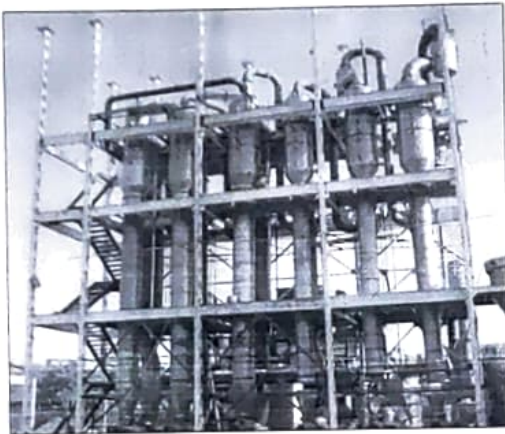
Copy To :- Acc / Store / Purchase/Dept- Engineering - 2



ANNEXURE - B



# Charter for Zero Liquid Discharge (ZLD) in Molasses Based Distilleries



**Central Pollution Control Board**



**Contents**

1.0	Introduction .....	4
2.0	Quality of Molasses in North India .....	5
3.0	Quality of Indian molasses .....	6
4.0	Manufacturing Process of Alcohol .....	6
5.0	Problem analysis and Spent wash characteristics .....	8
6.0	Review of practices of ferti-irrigation and pre-sown irrigation (one-time land application): .....	11
7.0	Objectives of the Charter implementation programme .....	15
8.0	Proposed Strategy with holistic approach .....	17
9.0	Benchmarking of process technology vis-a-vis spent wash generation norms .....	18
10.0	Water Consumption in Molasses based Distilleries .....	21
11.0	Guidelines for Molasses based Distilleries .....	22
12.0	Available Effluent Treatment routes for achieving ZLD .....	24
13.0	Best Available Technologies .....	29
13.1	Yeast Propagation .....	29
13.2	Fermentation .....	29
13.3	Fermentation with spent wash recycle .....	30
13.4	Distillation .....	30
14.0	Distillery Effluent Treatment Technologies .....	31
14.1	Bio-methanation .....	31
14.2	Reverse osmosis (RO) .....	32
14.3	Multiple Effects Evaporators (MEE) .....	32
14.4	Bio-composting .....	33
14.5	Incineration of distillery spent wash .....	33
14.6	Drying of Spent wash .....	33
14.7	Condensate Polishing Unit (CPU) Technologies .....	34
15.0	Performance Norms and Output Conditions for Effluent Treatment Technologies .....	35
15.1	Biomethanation .....	35
15.2	Reverse osmosis .....	35
15.3	Multiple-effect evaporation (MEE) of distillery spent wash .....	36
15.4	Bio-composting .....	37
15.5	Incineration of spent wash .....	37
15.6	Dryers for spent wash drying .....	38
15.7	Technology for Recovery of FCO grade Potash Fertilizer and potash free organics/de-potash vinasse (DPV) from Molasses-based Distillery Spent Wash .....	38
15.8	Condensate polishing unit .....	39
16.0	Prescribed Standards to be adopted by Molasses based Distilleries .....	40

17.0 Annexure-I: Standard Operating Procedure (SOP) for Bio-composting operation for Molasses based distilleries..... 43

17.1 Specification of covered Bio-compost yard for Distillery operating throughout year ..... 45

17.2 Specification of Bio-compost yard for Distillery operating 270 days(excluding rainy season) ..... 47

18.0 Bio-compost area calculation:..... 49

19.0 Standard Operating Procedure (SOP) for Incineration boiler operation for Molasses based distilleries..... 50

**List of Tables**

Table 1: Characteristics of sugarcane juice, B heavy molasses and C heavy molasses ..... 5

Table 2: Raw spent wash characteristics from C heavy molasses..... 9

Table 3: Raw spent wash characteristics generated from different feedstock..... 9

Table 4: Typical Characteristics of Bio-methanated spent wash from C heavy molasses. 10

Table 5: Standards notified by MoEF vide GSR 176(E), April 02, 1996 for fermentation industry..... 17

Table 6: Comparison of different fermentation systems using C heavy molasses ..... 19

Table 7: Comparison between atmospheric and MPR distillation systems ..... 20

Table 8: Process technology and corresponding specific fresh water consumption and specific spent wash generation..... 21

Table 9: Biomethanation performance efficiencies..... 35

Table 10: Reverse Osmosis Performance Parameters ..... 36

Table 11: Combined raw spent wash process condensate plus spent lees and treated water characteristics..... 39



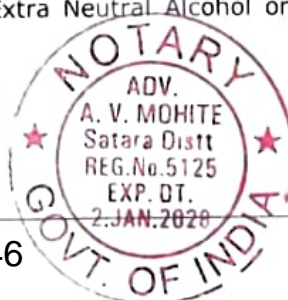
## **1.0 Introduction**

India is the largest sugar consumer and second largest producer of sugar and molasses. It is also the fourth largest producer of alcohol in the world while being the leading producer of alcohol in the South-East Asian region with about 65% of the total share. The major raw material for distilleries is molasses, a waste byproduct of sugar mills and grains. Sugarcane, the raw material for sugar mills, is one of the major crops of the country. Consequently, agricultural and rural economy is significantly dependent on sugarcane farming and associated industries. Besides, sugar mills, distilleries and associated industries also provide large employment potential and contribute substantially to economic development of the country. As per Indian Sugar Mills Association (ISMA), in 2018-19, the total estimated revenue realization from sugar and byproducts was 1 lakh crore of which 81% was contributed by Sugar Industry while distilleries contributed 13% and other byproducts contributed remaining 6%. It is apparently the 2<sup>nd</sup> largest revenue contributor per annum for the government.

Molasses, a byproduct of sugar industries is the major raw material for distilleries in India while a few distilleries also use grains such as sorghum, corn, rice, wheat, millet etc., as raw material. Since sugar season 2019-20, Government of India (GOI) has allowed use of either sugarcane juice, sugarcane syrup, B Heavy molasses or sugar as feedstock for ethanol production, apart from the conventional C heavy molasses. As compared to ethanol derived from C- heavy molasses route, diversion of B heavy molasses reduces the sugar availability by 15-20 % and increases ethanol availability by about 90-100%. On the other hand, diversion of sugarcane juice for ethanol production reduces sugar availability by 100% and increases ethanol availability by about 580-600%. Due to consistent surplus in sugar production and resulting depression in sugar price, diversion of sugar cane juice and B heavy molasses in ethanol production can boost both the ethanol economy as well as revive the sugar industry.

As per All India Distillers Association (AIDA), in 2019-20, there were 392 molasses based distilleries and 113 grain based distilleries in the country with total installed capacity of 6.93 billion litres per annum and 2.58 billion litres per annum respectively. In India, distilleries are classified as "Red Category" since molasses based distilleries consume significant quantities of fresh water and produce spent wash (vinasse) having very high pollution load.

In India alcohol is produced in the form of either i) Rectified Spirit (95 to 96 % v/v ethanol) that is mainly utilized for industrial purposes in the form of ordinary and special denatured spirit (ODS or SDS), ii) Extra Neutral Alcohol or Neutral Spirit (96 % v/v



ethanol that is used for manufacture of potable liquors and iii) Fuel Ethanol or Anhydrous Alcohol that is mainly used for blending with petrol.

The average capacities of Indian molasses based distilleries ranges between 30 to 60 KLPD. There are very few distilleries above 100 KLPD capacities as well. However, with aggressive implementation of Ethanol Blending Programme (EBP) by GOI, the capacities of Indian distilleries are now gradually increasing.

## 2.0 Quality of Molasses in North India

Molasses, a byproduct of sugar manufacturing from sugar-cane, is the main raw material for distilleries. The molasses (final or C molasses) produced from sugar mills in Uttar Pradesh and its neighboring states ranges between 4.0 to 5.25 % of the sugar-cane crushed. The B Heavy molasses is ranging in between 6.0 to 7.0 % of sugar-cane crushed. The typical characteristics of C heavy molasses, sugarcane juice and B heavy molasses available in Uttar Pradesh and its neighbouring states is given in Table 1.

The quality of Indian C heavy molasses is inferior as compared to the molasses available in countries such as Brazil and Australia and also varies widely within the country. The reason for inferior quality of molasses is manufacture of sugar by double sulphitation method that involves three and half boiling and use of SO<sub>2</sub> for sulphitation. However, the quality of B Heavy molasses is superior as compared to C molasses in terms of its fermentability. Yield of ethanol from final/ C heavy molasses is 235 litres/Ton while it is 310 litres/Ton from B heavy molasses.

**Table 1: Characteristics of sugarcane juice, B heavy molasses and C heavy molasses**

S. N.	Parameters	C Molasses	BH Molasses	Cane syrup
1	pH	5.01	5.41	4.74
2	°Brix	88.0	86.0	57.00
3	Total Reducing Sugars %	50.08	61.00	52.58
4	Unfermentable Sugars %	5.01	2.60	0.67
5	Fermentable Sugars %	45.07	58.40	51.91
6	Carbonated ash %	10.0	9.8	1.0
7	Sulphated ash %	13.0	11.5	2.5
8	F/N	1.05	2.2	6.4
9	Volatiles acidity (ppm)	5000	2000	1000
10	Sp. Gravity	1.40	1.35	1.19
11	Total microbial count (CFU/gram)	$5.6 \times 10^3$	$8.8 \times 10^1$	$7.5 \times 10^1$
12	Shelf life	1-2 years	1-2 years	Perishable



### 3.0 Quality of Indian molasses

As far as Indian molasses is concerned the quality of molasses is usually judged on the basis of following:

- i. **Fermentable to Non-fermentable (F/NF) ratio:** This should be as high as possible but not less than 1
- ii. **Level of contaminants in molasses:** The average contamination level in molasses is about  $10^3$  CFU/g of molasses. Higher level than this results in poor fermentation of molasses. (here, CFU/g- Colony Forming Unit per gm)
- iii. **Total Organic Volatile Acidity (TOVA) of molasses:** For good quality molasses the TOVA should be in the range of 3000-3500 ppm. Higher volatile acidity is an indication of contamination of the molasses and the volatile acids generated retards the fermentation rates.
- iv. **Sludge content of molasses:** The normal range of sludge content of molasses is 8.0-12.0% (v/v). Higher sludge content results in lowering the effective volume of fermenters and scaling problems in equipment and distillation columns.

### 4.0 Manufacturing Process of Alcohol

Production of alcohol comprises broadly of three sections, viz. (i) Fermentation (ii) Distillation and (iii) Effluent treatment and disposal.

- (i) **Fermentation:** Alcoholic fermentation is the process in which sucrose and reducing sugars (i.e. glucose and fructose) present in molasses/sugarcane syrup are converted into ethyl alcohol and carbon dioxide by the action of several enzymes present in yeast.
- (ii) **Distillation:** It is a purification step wherein the fermentation wash generated in the fermentation section, is subjected to heat in the analyzer column to separate alcohol from the wash on the basis of difference in boiling points. The alcohol is further subjected to purification in the pre rectifier and rectifier columns to obtain rectified spirit (95% v/v).
- (iii) **Effluent treatment:** The effluent generated from analyzer column after distillation of alcohol is known as spent wash while further purification of alcohol in pre rectifier and rectifier columns results in generation of weak effluent known as spent lees. Treatment of spent wash and spent lees is the last step in the production of alcohol.

Typical alcohol manufacturing process from molasses is illustrated in Fig 1 while manufacturing process from sugarcane juice is illustrated in process flow diagram given in Fig 2.



Figure 1: Typical process flow diagram for alcohol production from molasses

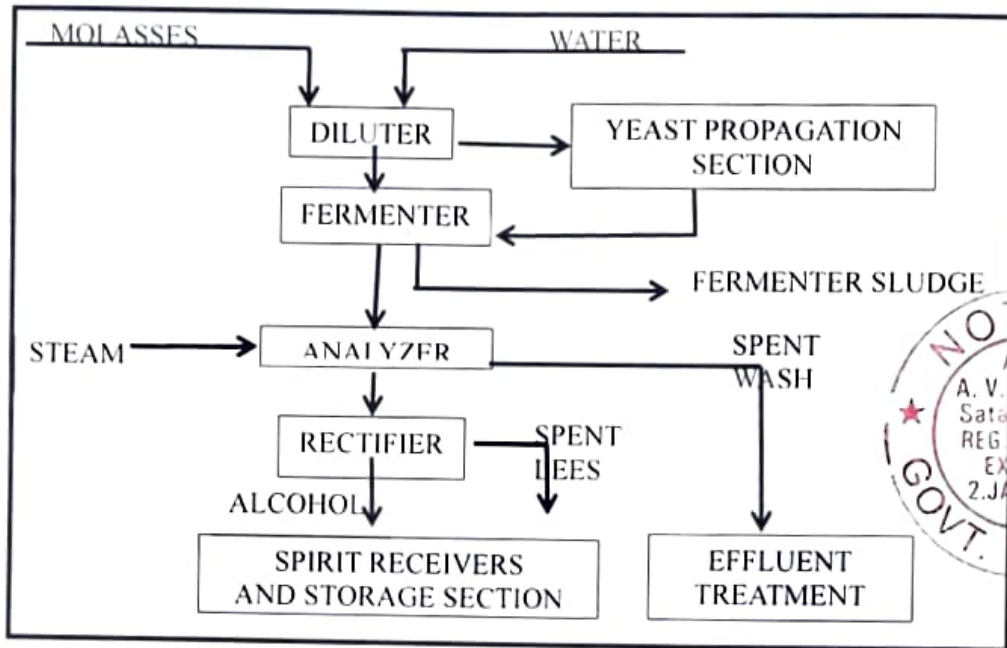
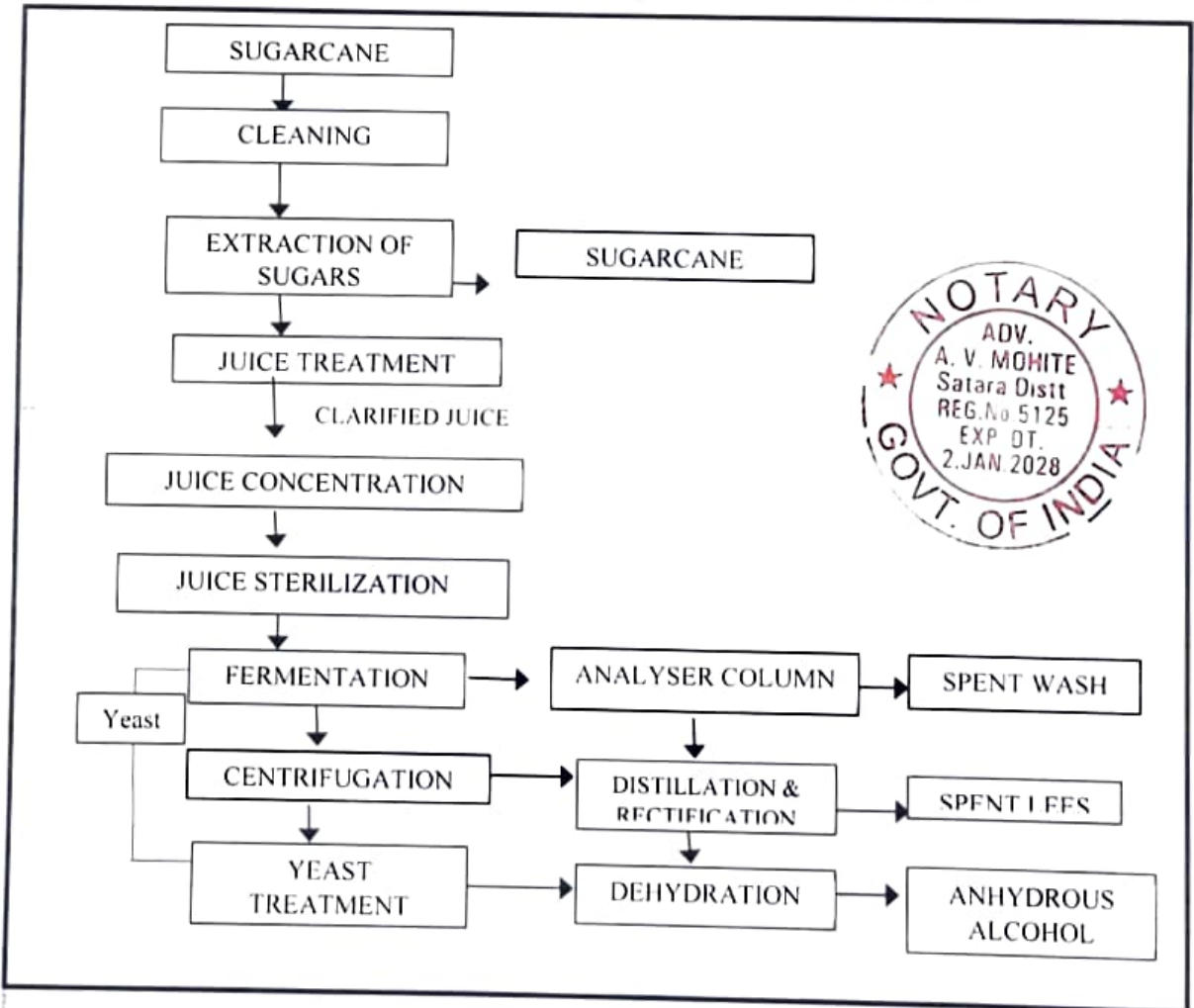
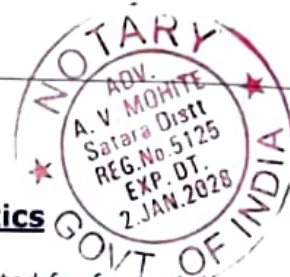


Figure 2: Process flow diagram for alcohol production from sugarcane juice





## 5.0 Problem analysis and Spent wash characteristics

Depending on the quality of molasses used, technology adopted for fermentation and distillation system employed, the raw spent wash generation (before concentration) can vary between 8.0 liters to 16.0 liters for every liter of alcohol produced. The general characteristics of spent wash generated by different fermentation techniques is given in Table 2. Comparative characteristics of spent wash generated from different feedstock in fed-batch fermentation is given in Table 3.

Spent wash management is a challenge as disposal of the large volume of bio-methanated spent wash and /or raw spent wash (on average 10-12 KL/KL of alcohol in case of C heavy molasses) having high Chemical Oxygen Demand (COD) & Biochemical Oxygen Demand (BOD) and salt load is a serious concern for the distilleries. Pollution control authorities in the country have stipulated stringent norms for proper disposal of spent wash as its uncontrolled discharge may affect the land surfaces and water bodies; particularly the physical, chemical and biological properties of soil and water.

The enforcement of norms for effluent treatment and discharge in Indian distilleries is to achieve fresh water conservation and prevention of pollution while taking into consideration the limited availability of land for disposal as compared to the norms followed in other countries.

Distillery spent wash has very high BOD, COD and high BOD/COD ratio. The amount of inorganic substances such as chlorides, sulphates, phosphates, potassium and calcium are also very high. Its recalcitrant nature is due to the presence of melanoidins, caramel, polyphenols and variety of sugar decomposition products such as anthocyanins, tannins and different xenobiotics compounds. The unpleasant odour of the effluent is due to the presence of skatole, indole and other sulphur compounds, which are not effectively decomposed during fermentation and distillation. Melanoidins are formed by Millard amino carbonyl reaction and have antioxidant properties, which make them toxic to many microorganisms. High COD, total nitrogen and phosphate content of spent wash can result in eutrophication of natural water bodies. The highly coloured compounds of the spent wash reduces sunlight penetration in water bodies, which in turn decreases both photosynthetic activity and dissolved oxygen concentration thereby affecting aquatic life.

Uncontrolled or random application of distillery spent wash on land is hazardous to the vegetation. It is reported to reduce soil alkalinity and manganese availability, thus inhibiting seed germination. Use of bio-methanated spent wash for irrigation without proper monitoring can affect the groundwater quality by altering its physicochemical properties such as colour, pH, electrical conductivity etc. due to leaching of the organic and inorganic ions.

The huge mass of effluent with highly objectionable organic matter renders the spent wash from distilleries unfit for direct discharge on land, irrigation as well as discharge



into rivers or streams. Decomposition of spent wash emits very bad smell causing atmospheric pollution. Therefore, proper treatment of this effluent is necessary.

**Table 2: Raw spent wash characteristics from C heavy molasses**

Sr.No.	Parameter	Batch process	Cascade process	Biostil process
1	Volume, L/L Alcohol	14-16	10-12	8-10
2	Colour	Dark brown	Dark brown	Dark brown
3	pH	3.7-4.5	4.0-4.3	4.0-4.2
4	COD	80,000-1,10,000	1,10,000-1,30,000	1,40,000-1,60,000
5	BOD	45,000-50,000	55,000-65,000	60,000-70,000
6	Total Solids	90,000-1,20,000	1,30,000-1,60,000	1,60,000-2,10,000
	Total Volatile Inorganic dissolved	60,000-70,000 30,000-40,000	60,000-75,000 35,000-45,000	80,000-90,000 60,000-90,000
7	Chlorides	5,000-6,000	6,000-7,500	10,000-12,000
8	Sulphates	4,000-8,000	4,500-8,500	8,000-10,000
9	Total nitrogen	1,000-1,200	1,000-1,400	2,000-2,500
10	Potassium	8,000-12,000	10,000-14,000	20,000-22,000
11	Phosphorus	200-300	300-500	1,600-2,000
12	Sodium	400-600	1,400-1,500	1,200-1,500
13	Calcium	2,000-3,500	4,500-6,000	5,000-6,500

Note: All values from S. No. 4 -13 are in mg/l.

**Table 3: Raw spent wash characteristics generated from different feedstock**

S. N.	Parameters	C Molasses	BH Molasses	Cane syrup	Cane syrup After recycle
1	pH	4.0	4.2	4.5	4.5
2	Color	Dark Brown	Yellowish brown	Pale Yellow	Pale Yellow
3	Quantity (L/L alcohol)	10	8	6	3
4	°Brix	12	8	2.5	4.5
5	COD (mg/L)	120000	80000	25000	45000
6	BOD (mg/L)	60000	40000	12000	22000
7	Dissolved solids (mg/L)	60000	50000	18000	24000
8	Suspended solids (mg/L)	30000	20000	3000	6000
9	Total solids (mg/L)	90000	70000	21000	30000
10	Nitrogen (mg/L)	1000	700	400	600
11	Phosphorus (mg/L)	300	200	100	150
12	Potassium (mg/L)	10000	4000	1000	1500

Although several technologies have been introduced for treatment of raw spent wash generated by distilleries, these include various biological treatments (anaerobic and aerobic), controlled land application, physicochemical and thermal treatments among others; the capital and recurring cost involved in the treatment of huge quantity of

SUGAR INDUSTRY



The various unit operations & processes of ETP are; Process effluent → V-Notch chamber → Bagasses Holding Tank → Bar screen chamber → Grit chamber → O&G skimmer → → Equalization tank with sparge aeration (lime addition → Anaerobic Tank → Secondary clarifier (with RAS recycling) → Supernatant collection tank → Pressure sand filter → Activated Sand filter → Treated effluent collection tank → Treated effluent discharge for irrigation as per CTO conditions. (Also provided 15 days storage lagoon for sugar effluents)

Primary & secondary sludge from tube settler & clarifiers → Sludge holding tank → Sludge drying beds → Dried sludge as soil conditioner.

- **Process condensate management:** As informed, excess condensate from multiple effect evaporators & pan evaporators are collected separately and The various unit operations & processes of are, Excess condensate → Two stage cooling tower → Treated condensate collection tank by enzymatic reactions → Treated condensate is reused in recirculation pump cooling & its accessories and spray pond make-up. Also, treated condensate is reused in utilities (cooling tower make-up) after treatment through Excess treated condensate is channelized to fresh water reservoir for reuse in process (sugar & distillery unit).

Secondary sludge from clarifiers sludge sent to drying bed of ETP of sugar industry.





DISTILLERY INDUSTRY

The various unit operations & processes of distillery effluents are; Process effluent → 5 day storage lined lagoon (1000 m<sup>3</sup>) → Treated effluent storage tank → Biomethanations (900 M3/day) 2 digesters → outlet of biodigester treated in MEE @300 m<sup>3</sup>/day → Spent wash lined lagoon (16100 &16800 m<sup>3</sup> i.e. 30 days capacity) at bio-compost yard → Concentrated spent wash → Bio-composting on 16 acre lined platform as per CTO conditions.

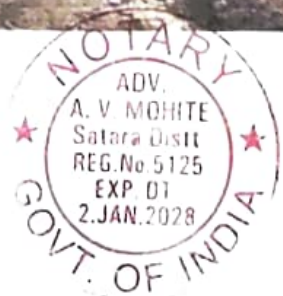
Biogas generation from biomethanations 16000-17000 m<sup>3</sup>/hr, which is used for co-gen boiler as a supplementary fuel and the excess biogas, is flared in the flaring system. Sludge from primary storage lagoon (5 day capacity) & yeast sludge from fermenters → Used in bio-composting.

- **MEE condensate management:** MEE condensate from multiple effect evaporator is collected and treated in. → Treated condensate collection tank with enzymatic reaction → Treated condensate is reused in molasses dilution & fermenter make-up, recirculation pump cooling & its accessories and utilities (cooling tower make-up).



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**De-sludge and shifted to compost yard**



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Rethare BK, Shivnagar, Karad**

**Photographs showing of scrapped old unlined spent wash storage lagoons**

