F. No. 4/1/2018-(BP& E)(Part)
Government of India
Ministry of Consumer Affairs, Food, and Public Distribution
(Department of Food and Public Distribution)
Directorate of Sugar & Vegetable Oils

Krishi Bhawan, New Delhi
Dated: 08.12.2020

OFFICE MEMORANDUM

Subject:- Mechanism for diversion/sale of B-Hy molasses, C-Hy molasses, Cane juice, Sugar syrup and sugar used by sugar mills for production of ethanol as well as quantity of ethanol produced from the B-Hy molasses, C-Hy molasses, Cane juice, Sugar syrup and sugar by the distilleries: Guidelines reg.

The undersigned is directed to say that the Government vide DFPD's Order No S.O.4149(E)/Ess. Comm./Sugarcane dated 19.11.2019 inter-alia allowed sugar mills for production of ethanol directly from sugarcane juice or sugar syrup or sugar besides molasses including B-Hy molasses.

2. Based on the recommendations of duly constituted Committee, this Department in supersession of earlier guidelines issued vide OM No.4/1/2018(BP&E) dated 22.11.2019, is hereby issuing a new set of guidelines indicating the detailed mechanism for production of ethanol separately by diversion of B-Hy molasses or C-Hy molasses or cane juice/ sugar syrup/sugar including sale of B-Hy molasses for strict compliance by the sugar mills and distilleries.

Enclosure: as above

08.12.2020

(Vivek Shukla)
Director (Sugar)
#011-23383760

To,

1. Principal Secretaries in charge of Sugar of concerned States
2. Principal Secretaries of Excise Departments of concerned States
3. Cane Commissioners of concerned States
4. Ministry of P&NG
5. All sugar mills with attached distilleries
6. ISMA/ NFCSF with a request to circulate the guidelines among its member sugar mills.

Guidelines for the sugar Mills diverting C-Hy, B-Hy, Sugarcane Juice, Sugar Syrup and Sugar for production of ethanol by distilleries(Reference DFPD OM No.4/1/2018(BP&E)dated 22.11.2019)

This guidelines is issued in supersession to earlier guidelines issued vide OM No. 4/1/2018-(BP&E)(Part-I) dated 22nd November 2019 which were revisited, particularly, with reference to parameters to be considered for determining quality of B Heavy molasses, recovery loss and trade of B Heavy molasses.

Part-I

Definitions:

i. Sugarcane juice shall mean, primary juice, secondary juice, mixed juice and clear juice as obtained by sulphitation or defecation process.
ii. Sugar syrup shall mean concentrated sugarcane juice having total dissolved solid content not less than 50^0 as indicated by brix. Below 50^0 brix it may be treated as thick juice or juice depending upon the concentration as indicated by brix%.
iii. Sugar for this purpose shall mean white or off-colour or moist sugar having pol percent not less than 98.0.
iv. B-Heavy molasses shall mean the molasses obtained as a result of curing of B-massecuite and having purity comparable with the average purity of B –Hy molasses obtained during the same period of previous three sugar seasons with the similar process.

Part-II

General Recommendations:

i. During sugar season/ethanol year, the sugar factories & distilleries to obtain a process validation report from technical institute viz. National Sugar Institute (NSI), Kanpur/Vasantdada Sugar Institute (VSI) Pune or any technical institute designated by State Government.
ii. The process validation report is to be provided to the State Excise officials or any competent authority as designated by State Government.
iii. The ethanol produced through different routes i.e. B-heavy molasses, cane juice, sugar syrup and sugar is to be certified by the concerned state excise department or any authority as designated by State Government with unique serial no. for proper identification.
iv. The quality of the ethanol produced by either of the routes should conform to the desired specifications as per IS 15464 (2004): Anhydrous Ethanol for use in Automotive Fuel or as per the requirement of OMC's. As specified in their tender document, the ethanol content % by volume shall not be below 99.6 at 15.6 deg. C.
v. The distilleries i.e. ethanol units shall be operated with one type of feed stock at a time i.e.

08.12.2020

(a) C-Hy molasses
(b) B-Hy molasses and,
(c) Sugarcane juice/ Sugar syrup/Sugar.

Part-III

A. Diversion of B-Hy Molasses:

1. The C-Hy and B-Hy Molasses from respective centrifugals to be collected in separate receiving tanks. The C-Hy molasses and B-Hy molasses tanks should have proper identification labeling in different colours e.g. for C-Hy molasses the labeling may be in darker brown, whereas, for the B-Hy molasses it can be lighter brown. Similar colour coding to be provided for their respective pipe lines in the sugar factory wherever used.
2. Separate pumps with no interconnecting pipe lines to be used for both types of molasses so as to send them to the respective storage tanks available in the sugar factory having proper identification marks. Under the normal circumstances, no underground pipelines shall be used for the purpose.
3. While diverting B-Hy molasses, boiling of C or other down the line massecuite shall not be allowed. Separate storage facilities to be provided for C-Hy& B-Hy molasses and any intermixing of the two different qualities of molasses shall be avoided. However, during the period when B- Heavy molasses is diverted, the sugar factories are allowed to use the existing C-Heavy molasses storage facilities subject to validation of their storage plan by NSI/VSI or any competent authority as designated by State Government and with prior information/approval of the state excise officials.
4. In case, in a sugar factory, two separate processing streams from cane crushing to sugar bagging and molasses storage are available and proper recording of data is made for the two different streams, factory may divert B-Heavy from one stream subject to fulfillment of other conditions as specified in guidelines.
5. Maxwell Bolougne type weighing scales or load cell based weighing system etc.to be provided to ascertain the respective molasses sent out of the process house of the sugar factory to the respective storage tanks. Alternatively, the factories may use calibrated mass flow meters with check weighment facility.
6. Like wise to measure and record the consumption of the two types of molasses for ethanol production, separate system for the liquidation to be provided in the respective storage tanks having separate pumps with a Maxwell Bolougne type weighing scale or load cell based weighing system or installing calibrated mass flow meters in the discharge line with check

08.12.2020

weighment facility. After the flow meters or weighing system, the molasses may be sent out through a common line.

7. Proper recording of production, dispatch of each type of molasses is to be made in log books on two hourly basis while stock taking to be made on day to day basis by the sugar factory. A separate log-book is to be maintained for this purpose.

8. The distillery i.e. ethanol unit shall be operated with one type of feed stock at a time i.e. C-Hy or B-Hy molasses as per (3) above for molasses & ethanol produced from two different routes to have correct estimation of the ethanol yield from either type of molasses. In case, the factory gives an undertaking to produce and divert only B- Heavy molasses, the distilleries as per para (3) may be allowed to use the existing C-Heavy molasses storage and ethanol storage facilities with prior information/approval of the state excise officials or any competent authority as designated by State Government.

9. The important quality parameters viz. Brix, Purity, TRS (Total reducing sugar) content of B-Hy molasses sent from the processing house to be recorded on day to day basis by the sugar mill. Such analysis is to be carried out and recorded by the sugar mill at the time of dispatch from the storage tanks and by the distillery at the time of its use.

10. B-Hy molasses purity being recorded by the factory during the run is to be comparable with the average purity of B –Hy molasses obtained during the same period of previous three sugar seasons for the similar process. For the factories not operated earlier, the brix and purity of B-Hy molasses shall be inferred from the purities recorded by nearby factories or shall be considered as minimum 48 for the run. Factories undertaking B-Hy diversion shall get the process and figures of molasses diversion validated from NSI/VSI or any competent authority as designated by State Government during each ethanol supply year.

11. The distillery i.e. ethanol unit, is required to record consumption and stock of molasses, production of ethanol as well as distillation and fermentation efficiency of the plant on daily basis. The distillery shall also be required to analyze and record the data with respect to quality of the molasses at the time of its use. For facilitating the analysis of C-Hy or B-Hy molasses for different parameters and for ethanol content, assistance of NSI/VSI or any NABL accredited laboratory or any competent laboratory as designated by State Government shall be taken up.

12. It would be essential to weigh and record the quantity of molasses used and ethanol produced from such molasses to ascertain the yield and potential.

08.12.2020

13. Due to the diversion of intermediate molasses i.e. B-Hy molasses instead of the conventional final molasses i.e. C-Hy or C-molasses, additional sugar loss is bound to occur resulting in lowering of sugar recovery by the factory but enhancing the ethanol production. Thus, sugar recovery should be estimated by using the following formula:

$$\text{Sugar Recovery \% Cane} = \text{Pol in Mixed Juice \% Cane} \times \frac{(J - 36.40)\,K}{0.636\,J}$$

(Where J is the purity of mixed juice and value of K is 1.002). For the factories producing raw sugar, the recovery of sugar may be higher & shall also be dependent upon the quality (basically pol %) and hence the same shall be factored in computing the recovery.

14. Sugar mills having distillery or those not having re-distillation facility, such mills may be allowed divert /transport/sale B Heavy molasses for re-distillation to other distillery for ethanol production. However, necessary certification from regional state excise/concerned state officials may be necessary and required registration in supply chain management portal/information to concerned agencies shall be essential.

15. In case of trade/sale/diversion of B-Heavy molasses as per para 14 above, proper recording of dispatch & receipt with respect to quality (Brix%, Purity and TRS%)& quantity to be maintained by the seller and the purchaser. When the B-heavy molasses is procured from other sources by a distillation unit, may be a standalone distillation unit for ethanol production, relevant guidelines applicable in case of distilleries integrated with sugar factories in respect of storage, weighment, colour coding, maintenance of records, quality of B-heavy molasses & validation of the process by NSI/VSI or any other competent authority as designated by State Government shall also be applicable.

B. <u>Diversion of Sugarcane Juice/ sugar syrup:</u>

1. Calibrated mass flow meters with check weighment facility shall be provided to ascertain the quantity of juice/syrup diverted for ethanol production.
2. In case of partial diversion, no any interconnecting pipe lines/by-pass arrangement shall be used. The juice/syrup diverted to the ethanol unit shall be stored in separate storage tanks having proper identification marks. Under the normal circumstances, no underground pipelines shall be used for the purpose of delivering the juice/syrup.
3. Proper recording of juice/syrup dispatches to be made in log books by the sugar factory. Recording of juice/syrup received, its consumption, ethanol

08.12.2020

production, distillation and fermentation efficiency shall be made on daily basis, by the distillery.

4. Important parameters with respect to quality of diverted juice/syrup viz. Brix, Purity, TRS (Total reducing sugar) content to be recorded on four hourly basis by the sugar factory and distillery.
5. In case of entire juice/syrup diversion, estimated sugar recovery may be calculated by using the following:

$$\text{Sugar Recovery \% Cane} = \text{Pol in Mixed Juice \% Cane} \times \frac{(J - 36.40)\,K}{0.636\,J}$$

(Where J is the purity of mixed juice and value of K is 1.002). For the factories producing raw sugar, the recovery of sugar may be higher & shall also be dependent upon the quality (basically pol %) and hence the same shall be factored in computing recovery.

6. In case, the sugar factory undertakes partial diversion of juice/syrup after accounting for it, the sugar recovery as it would have been in the conventional system shall be calculated by the above formula.

C. Diversion of Sugar:

1. Proper accounting shall be maintained for sugar dispatches by the sugar factory and consumption of sugar by the distillery on day to day basis.
2. Necessary sugar mingler, melter etc. shall be provided in the distillery along with mass flow meters and check weighmentsystem so as to ascertain flow of sugar melt into the process.
3. Sugar shall be processed exclusively or along with sugarcane juice or sugar syrup only.
4. While processing such sugar along with other feed stocks, proper accounting shall be maintained about sugar dispatches by the sugar mill and consumption of sugar and other feed stock by the distillery on day to day basis.
5. The sugar mill shall also maintain account of sugar diverted for production of ethanol while calculating the sugar recovery.
6. The data regarding receipt of sugar, ethanol production, fermentation and distillation efficiency shall be recorded by distillery on day to day basis.
7. The ethanol unit shall submit a work plan for arriving at ratio of sugar to other feed stocks which will require validation by NSI/VSI or any competent authority as designated by State Government.

08.12.2020

D. DIVERSION OF SPECIALLY DENATURED SPIRIT FOR ETHANOL PRODUCTION:

1. In case a standalone ethanol unit resorts to conversion of Specially Denatured Spirit made from cane juice/syrup/B Heavy molasses/Sugar for production of ethanol, it would be necessary to validate the process through NSI/VSI/other competent authority at the end of sugar factory(s) undertaking diversion of Cane juice/Sugar Syrup/B Heavy molasses/Sugar, distillery(s) producing specially denatured spirit from such diverted stream and also at the end of standalone unit converting such spirit to ethanol.
2. The other modalities mentioned in earlier paragraphs viz. recording of data with respect to purchase and sale, quantity and quality of feed stock & ethanol produced, operational conditions, colour coding and storage etc. shall have to be adhered to by the participating units.
3. Necessary certification from regional state excise/concerned state officials shall be necessary and required registration in supply chain management portal/information to concerned agencies shall be essential.
4. Proper recording of dispatch & receipt with respect to quality of feed stock i.e. cane juice/syrup/B Heavy molasses/Sugar (Brix%, Purity and TRS%, as applicable) & quantity to be maintained by the seller and the purchaser. In addition to this such records with respect to quality and quantity of Ordinary Denatured Spirit (ODS) to be maintained by the seller(s) and the purchaser.

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08.12.2020