ISCC
International Sustainability & Carbon Certification

ISCC GUIDANCE WASTE AND RESIDUES FROM PALM OIL MILLS

Version 3.0

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Content

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1 Introduction

Definitions, legal framework and verification process

This document provides definitions, process descriptions, and guidance for conducting ISCC audits of waste and residues that are generated by palm oil mills. The Renewable Energy Directive (EU) 2018/20011[1] (in the following referred to as RED II) includes definitions of and specific incentives for the promotion of biofuels, bioliquids or biomass fuels originating from waste and residues. Only a consistent verification process can avoid a deliberate increase in the production of waste or residues, e.g. by an intentional modification of the process to increase the amount of waste, or a deliberate declaration of material as waste or residue, e.g. by deliberately contaminating products to meet the definition of a waste or residue.

For waste and residues there is a special focus on the point of origin as this is the supply chain element where it is determined if a raw material meets the definitions for waste or residues. Furthermore, for points of origin of waste or residues a different risk approach is applied, leading to differences in the frequency and intensity of audits compared to the process for (cultivated) biomass from agriculture or forestry. Waste and residues generated by palm oil mills, such as Palm Oil Mill Effluent (POME) or Empty Palm Fruit Bunches (EFBs), and the respective oil that can be recovered from these substances, are considered as “advanced” raw materials according to Annex IX Part A of the RED II. The RED II sets mandatory targets for advanced biofuels, i.e. biofuels that are produced from raw materials listed in Annex IX A. The mandatory target for advanced biofuels increases to 3.5% until 2030. At the same time, it is specified in the RED II that “high ILUC-risk biofuels” shall be phased out and thus cannot be used towards the RED II targets. This guidance document and the included measures were developed by ISCC and its stakeholders to mitigate potential (fraud) risks resulting from an increasing demand for “advanced” waste raw materials generated in palm oil mills.

Responsibility of auditors

It is the responsibility of the auditor to determine whether a material meets the definition for waste and residues at the point in the supply chain where the material originates (i.e. the point of origin). Furthermore, it is the responsibility of the auditor to follow the guidance that is specified in this document.

2 Scope and Normative References

The requirements described in this document specify the audit and certification process of waste and residues that are generated in palm oil mills. This document supplements the ISCC EU system document 202-5 Waste and Resisdues in its currently applicable version as published on the ISCC website.

[1] *Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources (recast), in the following referred to as RED II*

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3 Palm Oil Mill Effluent (POME)

7.1 Definition

POME and POME oil

POME is the unavoidable wastewater arising from palm oil production at a palm oil mill (i.e. the point of origin). POME consists mostly of water, and a small percentage of oil and solid matter. POME volume and composition varies by Fresh Fruit Bunch (FFB) composition, processing setup and conditions, and efficiency of the mill. The following terminology shall be applied under ISCC:

> POME (referring to the wastewater from the palm oil mill)

> POME oil (referring to the oil recovered from the wastewater from the palm oil mill)

Any oil which is not recovered from the wastewater of a palm oil mill cannot be labelled as POME oil. Labelling or selling other types of oil (e.g. Palm Fatty Acid Distillate - PFAD, high FFA CPO, “acid oil”, etc.) as POME oil is a critical and fraudulent violation of ISCC requirements.

7.2 POME Treatment and GHG Emissions

Skimming from POME ponds

POME is traditionally released from the palm oil mill into a system of ponds to remove solids, oil and grease before land application or discharging the water into waterways. The oil settles on top of the pond from where it can be recovered (skimmed off). After skimming off the oil from the pond, the oil is usually decanted to further reduce the water content. Decanting may take place at the palm oil mill or at a separate location.

Other pathways to recover POME oil

Oil recovery from POME is also possible through the implementation of different technologies, such as e.g. centrifuges, prior to releasing POME to the ponding system. POME oil is considered to have zero GHG emissions at the palm oil mill (the point of origin from where it is collected). The RED II does not contain GHG default values for biofuels derived from POME oil, i.e. downstream supply chain elements must calculated actual GHG emissions, e.g. for transport and processing.

For further information about the potential sources for POME oil in the palm oil mill as well as for indicative yields please see figure 1 in Annex 7.1.

4 Empty Palm Fruit Bunches (EFBs)

4.1 Definition

EFBs and EFB oil

EFBs are the remains of the palm fresh fruit bunches (FFBs) after the fruit has been removed (“stripped”) for oil pressing. EFBs are an unavoidable (solid) waste from the palm oil production process. EFBs usually have a high moisture content, which poses challenges for further utilisation of the EFBs, and still contain a small amount of residual oil. EFBs can undergo a treatment

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process to reduce the moisture content by applying different technologies, where EFB liquor is extracted, e.g. the so-called “EFB Screw Press”. Residual oil can be recovered from “EFB liquor”, the wastewater from EFB treatment. Oil that is recovered from EFBs at the palm oil mill shall be referred to as “EFB oil”. Oil which is not recovered from EFBs cannot be labelled as EFB oil. Labelling other types of oil (e.g. Palm Fatty Acid Distillate - PFAD, high FFA CPO, “acid oil”, etc.) as EFB oil is a critical and fraudulent violation of ISCC requirements.

4.2 EFB Treatment and GHG Emissions

EFB oil recovery

EFBs are traditionally burnt in incinerators or in simple burners to generate ash (often undesirable or forbidden because of potential air pollution), or left on a heap before being returned to plantations close to the mill where they may be used as mulch. However, this process may lead to additional GHG emissions due to spontaneous and uncontrolled composting. Different treatment technologies can be applied to reduce the moisture content and to facilitate more efficient combustion of the EFBs. From this process a small amount of residual oil may be recovered. If the oil mill has implemented EFB treatment technologies, it must demonstrate to the auditor how much oil is recovered from EFBs. EFB oil recovered at the palm oil mill is considered to have zero GHG emissions. The RED II does not contain GHG default values for biofuels derived from EFB oil.

For further information about the potential sources for EFB oil as well as for indicative yields please see figure 2 in Annex 7.

5 Pressed Palm (Mesocarp) Fibers (PPF)

5.1 Definition

PPF and PPF oil

Pressed palm (mesocarp) fibers are the remainders from pressing palm fruits. These pressed (or “spent”) palm fibers are usually burned as fuel in the palm oil mill. Small amounts of residual oil can be recovered from the fibers before they are burned. The amount of residual oil in the pressed fibres depends on the effect of sterilisation on the fruit, the conditioning of the sterilised fruits in the digester, and the pressure exerted on the press cake during pressing. Oil that is recovered from pressed palm fibers shall be referred to as “Pressed palm fiber oil” (or “PPF oil”). Oil which is not recovered from pressed palm fibers cannot be labelled as “Pressed palm fiber oil”. Labelling other types of oil (e.g. Palm Fatty Acid Distillate - PFAD, high FFA CPO, “acid oil”, etc.) as “Pressed palm fiber oil” is a critical and fraudulent violation of ISCC requirements!

5.2 PPF Treatment and GHG Emissions

Residual oil can be recovered from the fibers, e.g. through solvent extraction or other methods, before the fibers are burned. Pressed palm fiber oil

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recovered at the palm oil mill is considered to have zero GHG emissions. The RED II does not contain GHG default values for biofuels derived from pressed palm fiber oil.

For further information about the potential sources for PPF oil as well as for indicative yields please see figure 3 in Annex 7.3.

6 Audits of Palm Oil Mills

6.1 Annual Audits of Palm Oil Mills

All palm oil mills generating and supplying waste and residues as sustainable under ISCC must be audited on-site annually[2]. This means, the group auditing approach for points of origin as described in ISCC Document 203 Traceability and Chain of Custody (i.e. auditing only a sample of the points of origin) cannot be applied for palm oil mills. This requirement shall come into effect for all certification audits that are conducted as of 01 November 2022.

This leaves two options for palm oil mills:

1 Individual certification of the palm oil mill as Point of Origin (PoO) following an annual audit. In this case the certificate will be issued to the individual mill. Palm oil mills which are already ISCC certified (i.e. for the CPO, i.e. the main product of the mill) can add the PoO scope to the already existing ISCC certificate. The ISCC requirements for the CPO and for the waste and residues can thus be covered during one single audit.

2 100% of those palm oil mills which are not individually certified and which are supplying waste or residues as sustainable under ISCC to a Collecting Point (together with a self-declaration) have to be audited on-site during the annual certification of the Collecting Point. This means, auditing only a sample of these points of origin is not allowed. In this case, the certificate will be issued to the Collecting Point. The palm oil mills supplying sustainable waste and residues to the Collecting Point do not require an individual ISCC certificate.

[2] *Remote audits might be acceptable on an exceptional basis in case of travel restrictions due to the COVID19 pandemic.*

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6.2 Guidance for the Audit of a Palm Oil Mill (POM) generating Waste and Residues

The following steps shall be conducted by the auditor
Check the annual production capacity of crude palm oil of the POM (shall be indicated in the ISCC audit procedure)
Check how many FFBs (in metric tons) have been processed by the POM in the 12 months period prior to the audit (shall be indicated in the ISCC audit procedure)
Check what type of sterilizer is used (horizontal or vertical) in the POM
Check how POME oil is recovered, i.e. from the pond or prior to the pond (shall be indicated in the ISCC audit procedure)
If POME oil is recovered before discharging the POME to the pond, check that the respective technology is available and functioning (visual inspection, layout plan, process diagram, etc.). Check where the recovered POME oil is stored.
If the POM recovers EFB oil and/or PPF oil, check that the respective technology is available and functioning and where the recovered oil is stored (visual inspection, layout plan, process diagram, etc.).
Check how much POME oil / EFB oil / PPF oil was generated by the POM in the 12 month period prior to the audit (shall be indicated in the ISCC audit procedure)
Check if the recovered POME oil / EFB oil / PPF oil is further treated (e.g. purified, cleaned, etc.) and if yes, where this treatment is conducted and that losses from the process are taken into account appropriately
Check how many recipients collected/received POME oil / EFB oil / PPF oil from the POM in the previous certification period
Check how often POME oil / EFB oil / PPF oil was collected from the mill (verify respective delivery documents, contracts, etc.)
In case the POM is individually certified as Point of Origin, check the outgoing sustainability declarations
Check if the POM delivers POME oil / EFB oil / PPF oil under other voluntary or national sustainability certification schemes (e.g. RSPO, Italian National System, etc.). If this is the case, deliveries and amounts sold under the respective other scheme(s) must be included in the verification process to ensure that no double-accounting of POME oil / EFB oil / PPF oil takes place between different systems.
Verify the plausibility of the amounts of POME oil / EFB oil / PPF oil generated and sold by the POM by using the figures displayed in the respective process diagrams in this guidance document • Note: The plausibility of the amount of POME oil recovered at a POM depends on the methodology to recover the oil. Recovery from the pond („skimming off“) is less efficient than recovery in a pre-treatement step like a centrifuge. • Note: If the amount of POME oil / EFB oil / PPF oil generated by a POM is higher than the figures shown in the previous slides, an in-

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depth analysis must be conducted by the auditor at the POM. The POM in this case must provide evidence to the auditor that sufficiently explains why the amounts of POME oil / EFB oil / PPF oil are above the thresholds in the individual case.

- Example: A POM with a horizontal sterilizer processes 250.000mt of FFBs per year produces approximately 50.000mt CPO. EFBs are burnt or sent back to the plantation (no further treatment of EFBs). Pressed fibers are burnt (no oil recovery from PPFs).
- Plausibility check: Generally, when processing 250.000 mt of FFBs in a mill with a horizontal sterilizer a plausible range of POME oil would be between 525mt of POME oil (250.000mt FFBs * 2,1kg POME oil/ton FFB / 1000) and 1.900mt of POME oil (250.000mt FFBs * 7,6kg POME oil/ton FFB / 1000) depending on the processes applied at the POM. If the POME oil is recovered (skimmed) from the pond, the plausible amount would be around 525 mt per year. If the mill applies another (more efficient) recovery methodology to recover the oil before discharging the POME to the pond, an amount of up to 1.900mt per year would be plausible. Since the POM burns the EFBs and the pressed fibers, no EFB oil / PPF oil is recovered and thus no EFB oil / PPF oil can be sold by or collected from this POM.

6.3 Guidance for the Audit of a Collecting Point collecting Waste and Residues from Palm Oil Mills

The following steps shall be conducted by the auditor
Check the list of all palm oil mills (POMs) from which POME oil / EFB oil / PPF oil is collected: How many POMs have supplied POME oil / EFB oil / PPF oil (to be separately indicated in the ISCC audit procedure)?
How much POME oil / EFB oil / PPF oil was collected in total in the previous certification period (to be indicated in the ISCC audit procedure)? Compare this with the number of POMs on the list. Is the total amount of material plausible?
Check the plausibility of the collection process and the logistics: • How many drivers and trucks perform the collection and what is the loading capacity of one truck? • Where is the oil stored once it was collected (on-site at the collecting point or at external storage facilities)? A visual inspection of the facilities is required (for external storage facilities a sample must be audited). • Are the processes and logistics plausible for the amounts that are collected and stored? • Are dependent collecting points (service providers collecting and storing the material) used?
Check if the collected POME oil / EFB oil / PPF oil is further treated (e.g. purified, cleaned, etc.) and if yes, where this treatment is conducted

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• Note: If such treatment takes place, losses from the process must be taken into account appropriately
Check if the Collecting Point also receives fresh (virgin) oils e.g. from other suppliers • Note: If the Collecting Point also receives fresh oils from other suppliers, a higher risk must be applied during the audit
Check if the Collecting Point is certified according to voluntary or national sustainability certification schemes other than ISCC, including but not limited to RSPO, Italian National System, etc. If this is the case, mass balances and deliveries under the other scheme(s) must be checked during the ISCC audit to ensure that „double-accounting“ or “re-labelling“ of POME oil / EFB oil / PPF oil between different certification schemes does not take place
The following aspects must be verified individually for a sample of all palm oil mills (POMs) delivering POME oil / EFB oil / PPF oil to the Collecting Point. This verification is to be conducted by the auditor during the on-site audit of the collecting point. The sample is at least the square root of all POMs from which POME oil / EFB oil / PPF oil is collected (see list of POMs) multiplied with the risk factor (determined by the auditor). Example: If oil is collected from 10 POMs, the following aspects must be checked for at least 4 POMs. • Check the corresponding ISCC self-declarations, or, if the POM is certified, check the validity period of the certificate and the scope (point of origin for POME oil / EFB oil / PPF oil) • Check how the POME oil is recovered from the POME (is the collecting point „skimming off“ the oil from the pond or does the POM itself recover the oil before the POME is released to the pond?) • Check how often POME oil / EFB oil / PPF oil is collected from the POM. Is the collection frequency plausible? Note: If POME oil is recovered from a pond, it can be assumed that the collection does not take place as often as from a POM recovering the POME oil in a „continuous“ internal process (no recovery from the pond) • Check how much oil was collected in total from the POM and if the amount is plausible. Note: Take into account how often oil was collected, the way how oil is being recovered, the capacity of the collection truck, losses from further treatment (if applicable), etc.

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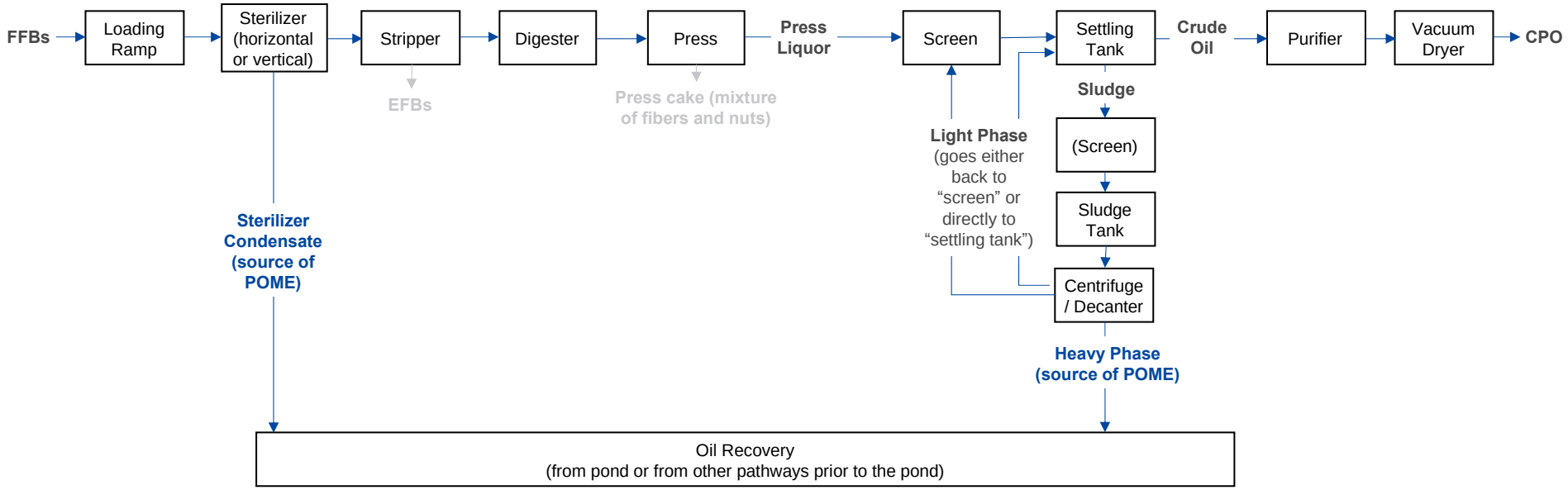
7 Annex: Palm Oil Mill Process Diagrams

7.1 Oil from Palm Oil Mill Effluent



Palm Oil Mill with Horizontal Sterilizer (approximate figures)	
Oil content of sterilizer condensate	0.5 kg/ton FFB[1] – 2.1 kg/ton FFB[2]
Oil content of heavy phase	1.6 kg/ton FFB[2] – 5.5 kg/ton FFB[3]
Total POME oil content	**2.1 kg/ton FFB – 7.6 kg/ton FFB**

Palm Oil Mill with Vertical Sterilizer (approximate figures)	
Oil content of sterilizer condensate	0.5 kg/ton FFB[1] – 17.4 kg/ton FFB[2]
Oil content of heavy phase	5.5 kg/ton FFB[3] – 11.4 kg/ton FFB[2]
Total POME oil content	**6 kg/ton FFB – 28.8 kg/ton FFB**

Sources:
[1] Environmental Management Guideline for the Palm Oil Industry. Sep 1997. Note: No differentiation between horizontal and vertical sterilizer.
[2] Averages calculated based on actual company data for a sample of 17 palm oil mills (10 with horizontal sterilizer, 7 with vertical sterilizer)
[3] Alflaval Presentation POMEVap technology. Oct 2020

Figure 1: Oil from Palm Oil Mill Effluent (POME). Note: Process and figures may vary in the individual case.

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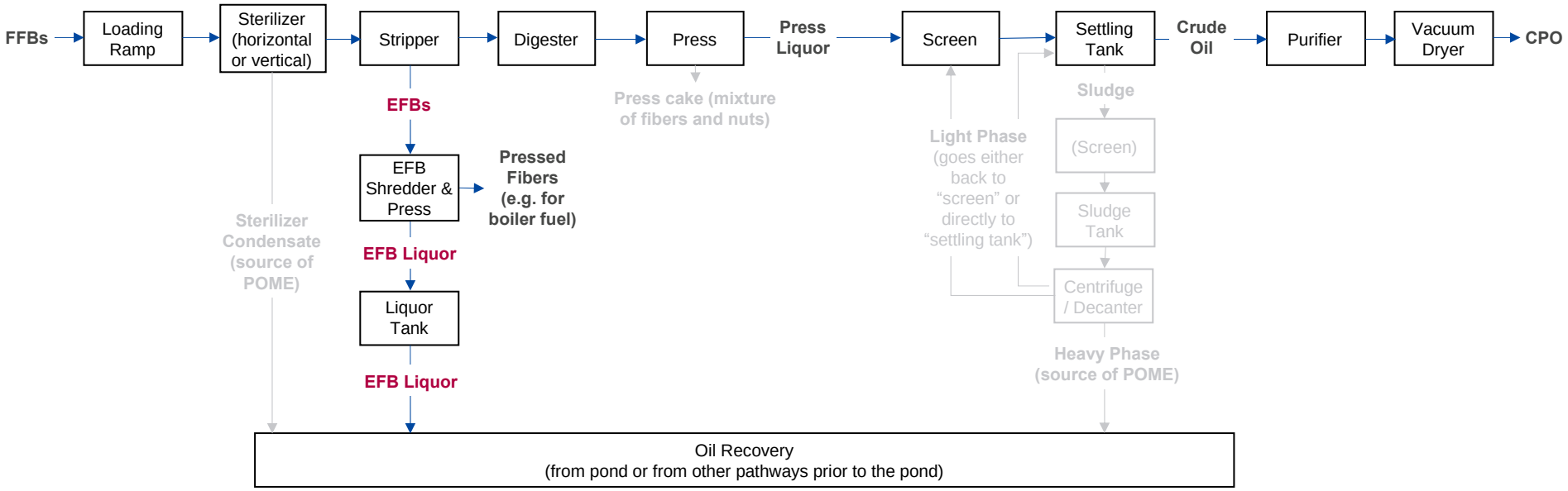
7.2 Oil from Empty Plam Fruit Bunches



Palm Oil Mill with Horizontal Sterilizer (approximate figures)	
Amount of EFBs generated	230 kg/ton FFB[3]
Oil content of EFBs	**4.5 kg/ton FFB[1] – 6.7 kg/ton FFB[2]**

Palm Oil Mill with Vertical Sterilizer (approximate figures)	
Amount of EFBs generated	230 kg/ton FFB[3]
Oil content of EFBs	**4.5 kg/ton FFB[1] – 10.1 kg/ton FFB[2]**

Sources:
[1] Environmental Management Guideline for the Palm Oil Industry. Sep 1997. Note: No differentiation between horizontal and vertical sterilizer.
[2] Averages calculated based on actual company data for a sample of 17 palm oil mills (10 with horizontal sterilizer, 7 with vertical sterilizer)
[3] A. Abdulrazik et al. / Journal of Cleaner Production 168 (2017)

Figure 2: Oil from Empty Palm Fruit Bunches (EFBs). Note: Process and figures may vary in the individual case.

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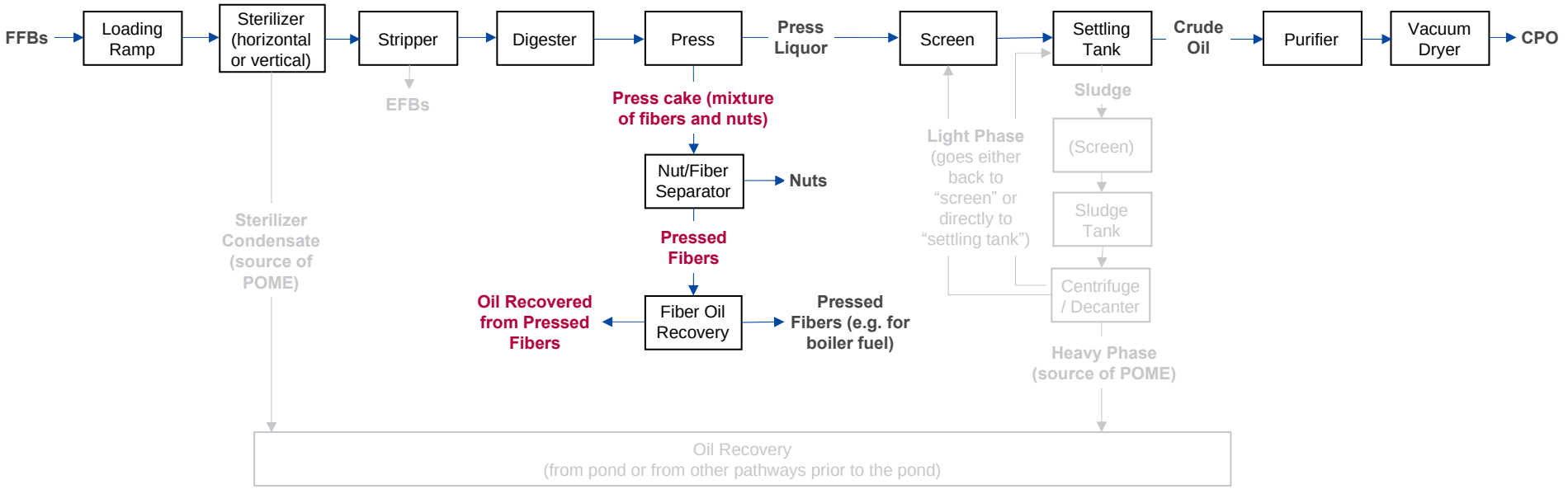
7.3 Oil from Pressed Palm (Mesocarp) Fibers



Palm Oil Mill without Process Specification (approximate figures)	
Oil content from pressed fibers	Up to 8% (on dry basis)[1, 2, 3]
Oil content from pressed fibers	**Up to 2.9 kg/ton FFB[3]**

Sources:
[1] eFood Vol. 1(6); December (2020), Extraction Methods of Virgin Coconut Oil and Palm-pressed Mesocarp Oil and their Phytonutrients
[2] International Food Research Journal, January 2011, Palm pressed fibre oil: A new opportunity for premium hardstock?
[3] MPOB Information Series, June 2011, Residual Oil Recovery System (RORS)

Figure 3: Oil from Pressed Palm (Mesocarp) Fibers. Note: Process and figures may vary in the individual case.

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