Palm Stearin

Basic Information

Palm Stearin Structure

Product Type	**Solid Fraction of Refined Palm Oil (RBD)**
CAS Number	**91078-48-7**
HS Code	**1511.90**
Origin	**Elaeis guineensis (fractionated from RBD Palm Oil)**
Main Fatty Acids	**Palmitic (C16:0): 48–74%; Oleic (C18:1): 15–37%**
Synonyms	**RBD Palm Stearin, Palm Stearin, Hard Fraction Palm Oil**
Grade	**RBD Palm Stearin (various IV grades)**

Description

Palm stearin is the solid fraction obtained by the fractionation (dry fractionation or solvent fractionation) of refined, bleached, and deodorized (RBD) palm oil. It is the higher-melting, more saturated fraction compared to palm olein.
Palm stearin is characterized by a high content of palmitic acid (C16:0) and is used extensively in food manufacturing, oleochemical production, soap manufacturing, and as a substitute for hydrogenated fats.
In industrial applications, palm stearin is a primary feedstock for the production of fatty acids (particularly palmitic acid), glycerine, soap noodles, and stearic acid through splitting and hydrogenation processes.

Technical Specifications

Appearance	**Semi-solid to solid white or pale yellow fat**
Color (Lovibond 5.25")	**Max. 3.0 Red**
Odor & Taste	**Mild, characteristic fatty odor and bland taste**
Free Fatty Acid (FFA as palmitic)	**Max. 0.1%**
Moisture & Impurities	**Max. 0.1%**
Iodine Value (Wijs)	**Below 48 g I?/100g (varies by grade: IV 14–48)**
Saponification Value	**193–205 mg KOH/g**
Peroxide Value	**Max. 5 meq O?/kg**
Slip Melting Point	**44–56 °C (varies with IV)**
Density (liquid, 60 °C)	**Approx. 0.875 g/cm³**
Refractive Index (at 50 °C)	**1.449–1.455**
Unsaponifiable Matter	**Max. 0.8%**
Flash Point	**>250 °C**

Uses and Manufacturing

Uses

Palm stearin has a broad range of food and industrial applications. In food manufacturing, it is used as a hard fat in the production of bakery shortenings, pastry margarine, vanaspati, and specialty fats that require high melting point and plastic

consistency. Its low polyunsaturated fat content and absence of trans fatty acids (when derived from non-hydrogenated sources) make it a functional and healthy-image replacement for partially hydrogenated fats in food processing.
Palm stearin is used in the formulation of cocoa butter equivalents (CBE) and cocoa butter substitutes (CBS) for the confectionery and chocolate industries. Its high palmitic acid content and specific triglyceride composition (predominantly PPP and POP) can be modified by chemical or enzymatic interesterification to produce fats with specific melting and crystallization profiles.
In the oleochemical industry, palm stearin is the preferred feedstock for producing palmitic acid and mixed palmitic/stearic acid via high-pressure fat splitting and distillation. Palm stearin-derived fatty acids are used to manufacture soaps, detergents, personal care products, and metallic soaps.
Industrial applications include: candle manufacturing (high-melting stearin wax), soap bar production (contributes hardness and lather), lubricant formulations, rubber processing, and surface coatings. In animal nutrition, palm stearin is a high-energy fat supplement used in ruminant feed.

Methods of Manufacturing

Palm stearin is produced by the dry fractionation of RBD palm oil. In this process, RBD palm oil is first heated above its melting point to ensure complete liquefaction and homogeneity, then cooled slowly in crystallization tanks under controlled temperature profiles (typically from 45–55 °C to 20–25 °C over 8–24 hours).
During controlled cooling, the higher-melting triglycerides (rich in palmitic acid) crystallize preferentially. The resulting slurry is then filtered under pressure using membrane filter presses or vacuum filters to separate the solid stearin fraction from the liquid olein fraction.
The iodine value (IV) of the stearin product is determined by the fractionation temperature and conditions. Lower fractionation temperatures yield a harder stearin with a lower IV (higher saturation). Quality parameters include IV, FFA, moisture, color, slip melting point, and fatty acid composition by GC.

Hazard Identification

Hazard Summary

Low toxicity. Not classified as hazardous. Combustible at elevated temperature.

Fire Hazard

Combustible fat with high flash point (>250 °C).

Skin, Eye & Respiratory Irritations

Non-irritating under normal conditions.

Safety and First Aid

Physical Dangers

Combustible solid fat. Hot molten stearin may cause burns.

Skin First Aid

Wash with soap and water. Treat burns from hot fat with cool running water.

Eye First Aid

Rinse with water.

Ingestion First Aid

Generally safe. Seek medical advice for unusual quantities.

Fire Fighting Procedures

Use CO?, foam, or dry chemical. Do not use water jet on burning fat.

Handling and Storage

Nonfire Spill Response

Small spill: If solid, sweep or scrape up and collect in labeled containers. If liquid (molten), contain and allow to solidify before collection. Warn of slip hazard from solidified fat on floor.
Large spill: Bund spill area. Pump liquid fat into recovery containers or allow to solidify. Do not allow large quantities to enter waterways (oxygen demand). Dispose according to local regulations.

Safe Storage

Store in stainless steel or mild steel tanks (heated for liquid storage) or in solid form in a cool, dry warehouse. Protect from oxidation by nitrogen blanketing in bulk storage. Avoid contact with copper, brass, or bronze which catalyze fat oxidation. Keep away from strong oxidizing agents and heat sources above 70 °C.

Storage Conditions

Recommended storage temperature: 50–60 °C if stored as liquid (above melting point of 44–56 °C). Solid storage at ambient temperature (15–30 °C). Shelf life: 12–18 months under proper conditions. Suitable containers: stainless steel tanks (heated), mild steel with internal lining, HDPE for small quantities. Nitrogen blanket strongly recommended. Protect from moisture and light.