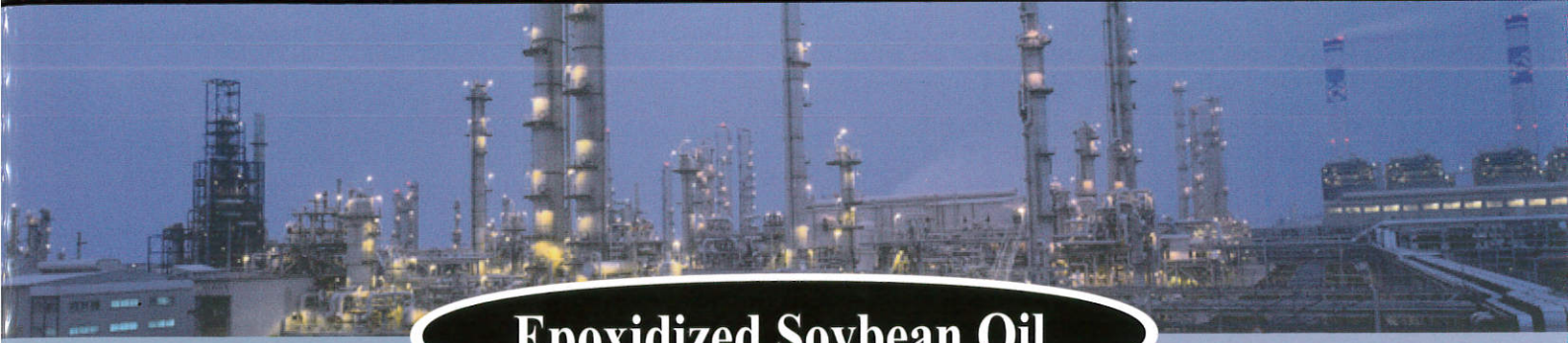

Epoxidized Soybean Oil

南亞塑膠工業股份有限公司
NAN YA PLASTICS CORPORATION

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Epoxidized Soybean Oil ESO - 132, ESO - 132 D

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Epoxidized Soybean Oil

ESO-132

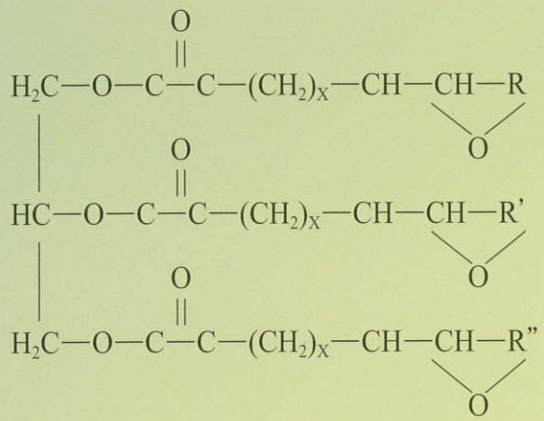
ESO-132D

ESO-132 , a product after oxidation of soybean oil , is widely used as non-toxic stabilizer and plasticizer in PVC processing.
The production technology is based on the cooperation between Nan Ya and Nippon Sanwa Gosei.

ESO-132D (Deodorized Epoxidized Soybean Oil), made of ESO-132 by a series of deodorization purifications is produced to meet the special requests in some applications.

Our products have ISO9001 and ISO14001 centifications

Physical & Chemical Properties

Trade name	ESO-132 | ESO-132D
Chemical Name	Epoxidized Soybean Oil
Chemical Formula	
Molecular Weight	About 1000
Melted Point	5 ℃
Boiling Point	> 150℃/ 5mmHg
Flash Point	315.6 ℃
Specific Gravity	0.982 ~ 1.002 (25℃)
Viscosity	400 ± 50 cps (25℃)
Weight Loss after Heating	0.2 % ↓
Refractive Index	1.470 ± 0.002 (25℃)
Color Number	200 (APHA) ↓
Acid Value	0.7mgKOH/g ↓ | 0.5mgKOH/g ↓
Oxirane Oxygen	6.4%~6.8% ↓ | 6.5%~6.8% ↓
Iodine Value	5.0 ↓

Characters of ESO-132 & ESO-132D

1. Non-toxic

Besides the approval from JHPA, PL specification B.7, item 1 (Approval No. J-7885), also meet strict FDA requirement, according to the stipulations on Food Additives (181.27 and 175.300).

ESO - 132 and ESO - 132 D can be used in association with stabilizers. For example, the combination between Ba-Zn and Ca-Zn series stabilizers with ESO, is in non-toxic applications. This non-toxic combination will be the mainstream in PVC processing.

2. Heat stability and Weather - resistance

The synergistic effect can be expected in case of the combination with metal series stabilizers. Thanks to the capability of the active epoxy ring to catch HCl and its antioxidation effect against degradation. After heating and light exposure, the cross-linking among PVC molecules can be minimized. Namely, the big-scale enhancement in both heat stability and weather resistance for PVC products can be expected.

3. Low volatility and High molecule plasticizer

Much lower in volatility than DOP (about 20% of DOP), it provides better stability in PVC flexibility. With about M.W. 1000, ESO - 132 can be regarded as a good plasticizer in PVC processing.

4. Low I.V., Good in non-migration resistance and extraction resistance

Low I.V., good compatibility with PVC Plasticizers, it therefore provides good performance in non-migration and extraction resistance.

5. Water - resistance, Oil - resistance and Low loss in transparency.

Applications & Description in PVC Processing

Applications / Formulas	Description
PVC Leather, film, Coating and Extrusion	● Better heat-resistance in combination with metal stabilizers. ● Improving transparency. ● Suggested dosage 0.5 - 2.0 PHR.
Films for packing	● Properly formulating with DOA or DINA, used as anti-freezing plastizers in PVC formulation. ● Suggested dosage 10.0 - 20.0 PHR.
Non-toxic	● Applicable in combination with Ba-Zn, Ca-Zn stabilizers. ● Suggested dosage ◆PVC Leather, film: 1.0 - 3.0 PHR. ◆Toys and Injection products: 3.0 - 5.0 PHR. ● Good to be applied in non-toxic products, such as toys, glove etc.
Toner & Master batch	● Good wetting to color powder, to enhance compatibility with PVC powder after blending with DOP, DINP and DIDP. ● Reducing compounding viscosity after mixing with inorganic pigments. ● Suggested dosage: 3.0 - 6.0 PHR.
Anti-weather	● Applicable to working with Ba-Zn series stabilizers. ● Suggested dosage: 1.0 - 3.0 PHR. ● Widely used as coverage film in agriculture and exterior hydrolysis-resistance cloth.
Fire-retardation	● Applicable in combination with stabilizers, to make up the stability in fire-retardation for Sb_2O_3 and Al_2O_3. ● Suggested dosage: 2.0 - 5.0 PHR.
Non-migration	● In pair with polyester-type plasticizers to enhance non-migration. ● Suggested dosage according to different products: ◆Non-migration cable and wire : 5.0 - 10.0 PHR. ◆Gasket of refrigerator: about 20 PHR.
Anti - fogging	● Applicable in pair with TOTM so as to enhance anti-fogging products. ● Suggested dosage: 5.0 - 10.0 PHR. ● Wildly applied in car panel products.
Low extraction formulas	● Coupling with polyester to work as a plasticizer for solvent and oil resistant formulas. ● Suggested dosage: 3.0 -5.0 PHR. ● Wildly used in flexible tubes.

Packing and Notices

In use

1. For PVC leather, film...etc, the suggested dosage no more than 3.0 PHR , if exceeded , being apt to bleeding.
2. For PVC packing film, the maximum dosage should be below 20.0 PHR . If exceeded , be careful with bleeding.
3. When printing is requested , the maximum dosage should be below 3.0 PHR , if exceeded , the weak cohesion between printing ink and PVC products may emerge.
4. With consideration of the poor initial color to PVC, in terms of those applications that initial color are essential , the ESO dosage is totally dependent on the dosage of stabilizer. The suggested dosage is 1.0 - 5.0 PHR .
5. 1.0 PHR dosage will bring the soft point of PVC down about 2 ℃. Especially, for rigid PVC applications , the dosage should be under proper control.
6. Epoxidized soybean oil weight is measured alone. Don't mix Epoxidized soybean oil with stabilizers or other additives to avoid reaction, cloud, broken, precipitation.

Storage and Transportation

1. ESO should be properly stored at the temperature below 45 ℃. If exceeded, polymerization will take place.
2. Contamination from rust and sand...etc will lead to the polymerization. It is suggested to put metal screen (28 mesh min.) in the vents of all storage tanks. The regular cleaning of the metal screen should be done.
3. Below 20 ℃, the viscosity of ESO soars up. If lower than 15 ℃, it is in the paste form (like lard). It is easy to get hard in pipe transportation. Heating it up to 45 ℃ max. can ease off the problem.

Safety

1. Skin contact may cause irritation, especially to those skin-allergic people. If contacted, wash off contamination with soap and water, seek medical attention if irritation persists.
2. If eye contacted, rinse for 15 minutes minimum with a gentle water stream, obtain medical attention if the symptoms persist.

Packing

1. Loaded in 53-gallon iron drum, 200 kg net per drum.
2. ISO tank available, 13MT per set or according contract.

Material Safety Data Sheet

1. Product and Company Identification

Product name：Epoxidized Soybean Oil

Synonyms：-

Recommened use and restrictions on use：Plasticizer-stabilizer for PVC articles.

Information on Producer/Supplier： Name：Nan Ya Plastics Corporation Petrochemical 2nd Division H2O2 Plant
Address：No.2,Formosa Industrial Park,Mailiao,Yunlin County, Taiwan,R.O.C. Phone：886-5-6818711~8714

Emergency phone：886-5-6818716 Fax：886-5-6811046

2.Hazard Identification

Hazard Category：-

Labeled Contents：
Symbols：-
Signal word：-
Hazard Warning Information：May be harmful if ingested
Hazard Prevention Measures：Do not ingestion

Other Hazards：-

3. Composition / Information on Ingredients

Substances：

English name：Epoxidized Soybean Oil

Synonyms：-

CAS No.：8013-07-8

Percentage for Chemical Ingredient：100%

4. First-Aid Measures

First-aid measures for different exposure routes：
Inhalation：1.Remove to fresh air.
Inhalation：2.If breathing is difficult,give oxygen .If not breathing,get immediate CPR.
Inhalation：3.Keep victim warm and get immediate medical attention.
Skin Contact：1.Immediately wash with plenty of soap and water while removing contaminated clothing..
Eye Contact：1.Wash the affected areas under running water for at least 15 minutes.
Eye Contact：2.If necessary, get medical treatment.
Ingestion：1.If victim awake ,rinse his(her)mouth.
Ingestion：2.Let drink with plenty of warm water or milk ,and then induce vomiting.
Ingestion：3. Get immediate medical attention.

Most important symptoms and hazardous effects：-

Protection for First aider：Rubber gloves and Safety glasses

Prompt to Doctor：-

5. Fire-Fighting Measures

Extinguishing Media：dry powder, carbon dioxide, foam

Most important symptoms and hazardous effects：-

Protection for First aider：Rubber gloves and Safety glasses

Notes to Physician：No special requirements

6. Accidental Release Measures

Personal Precautions：Wear chemical safety goggles,and Use rubber gloves or chemical protective gloves.

Environmental Precautions：1.If necessary,Equip ventilative equipment or facility. 2.Remove all ignition sources

Methods for Cleaning Up：1.Isolate the contaminated areas with dry sand,earth or clout to build temporary dikes in case of leakage enlarge. 2.Use clout to absorb spill or use similar method to treat,and then incinerate the clouts. 3.Clean with soap and water.

7. Handling and Storage

Handling：Avoid temperature over 45℃.

Storage：

1. Do not store at temperatures above 45℃. 2.Contamination from rust and sand...etc will lead to polymerization. It is suggested to put metal screen in the vents of all storage tanks. The regular cleaning of the metal screen should be done.3.Under low temperature environment, storage tanks or vessels shall be equipped with heating instrument.

8. Exposure Control / Personal Protection

Exposure Control：/

Control Parameters

TWA	STEL	CEILING	BEIS
—	—	—	—

Personal Protective Equipment：
Respiratory Protection：No special requirements.
Hand Protection：Rubber gloves.
Eye Protection：Chemical safety goggles.
Skin and Body Protection： Protective clothing, Protective boots.

Hygiene Procedures：

1. After work, remove the contaminated clothes as quickly as possible. Throw away or wash clothes thoroughly before wearing again. Notify the laundry personnel of the danger of the contaminated clothes. 2. Smoking and eating are strictly prohibited in work areas. 3. Wash hands thoroughly after handling this substance. 4. Keep the work area clean.

9. Physical and Chemical Properties

Appearance：Clear pale yellow, Fatty Liquid	Oder：mild oily odor
Odor threshold：-	Melting point：-
pH：/	Boiling Point/Boiling Range：>150℃ at 5mmHg ℃
Flammability：/	Flash Point：600° F
Decompositon temperature：-	Test Method：Open Cup
Autoignition temperature：-	Explosion limits：-
Vapor pressure：-	Vapor density：-
Density：0.982~1.002(water=1)	Solubility：0.01% (20℃)
n-octanol/water (log kow)：-	Percent Volatile：-

10. Stability and Reactivity

Stability：Stable

Special Conditions of Hazardous Reaction：Hazardous polymerization will occur when the temperature of storage above 45℃

Conditions to Avoid：Avoid temperature over 45℃.

Incompatibility：strong acids

Hazardous Decomposition Products：-

11. Toxicological Information

Exposure route: skin contact, eye contact, inhalation, ingestion

Symptoms：-

Acute toxicity：
inhalation：-
eye contact：irritate eyes.
skin contact：few people will be allergic skin.
ingestion：LD50 (test animal, absorption route): 4700 mg/kg (Rat, ingestion)

Chronic Toxicity or delayed Toxicity：-

12. Ecological Information

Eco-toxicity：
LC50(fish)：-
EC50(Daphnia)：-

Bio-concentration factor(BCF)：-
Persistence and degradability：
Half-life cycle (Air)：-
Half-life cycle（Water surface）：-
Half-life cycle（Groundwater）：-
Half-life cycle（Soil）：-

Bioaccumulative potential：-

Mobility in soil：-

other adverse effect：-

13. Disposal Considerations

1.Waste Disposal：Incineration.
2.Waste disposal should be in accordance with local environmental regulations

14. Transport Information

UN number：-

UN transport name：-

Transport hazard class：-

Packing group：-

Marine pollution(Yes/No)：No

Special transport way and note：-

15. Regulatory Information

Apply Regulation:
1. Enforcement Rules of the Labor Safety and Health Act
2. Regulations of Hazard Communication on Dangerous and Harmful Material
3. Standards of Tolerable Hazardous Substance Concentration in the Air of Labor Working Environment
4. Traffic Safety Regulations
5. Standards for the Storage, Clearance, and Disposal of Industrial Waste

16. Other Information

Literature references：None	
Responsible Department	Name：Nan Ya Plastics Corporation Petrochemical 2nd Division H2O2 Plant Address：No.2,Formosa Industrial Park,Mailiao,Yunlin County, Taiwan,R.O.C. Tel：886-5-6818711~8714
Prepared by	Title：Senior Engineer　　Name：Su Yuming
Date	2010/09/10
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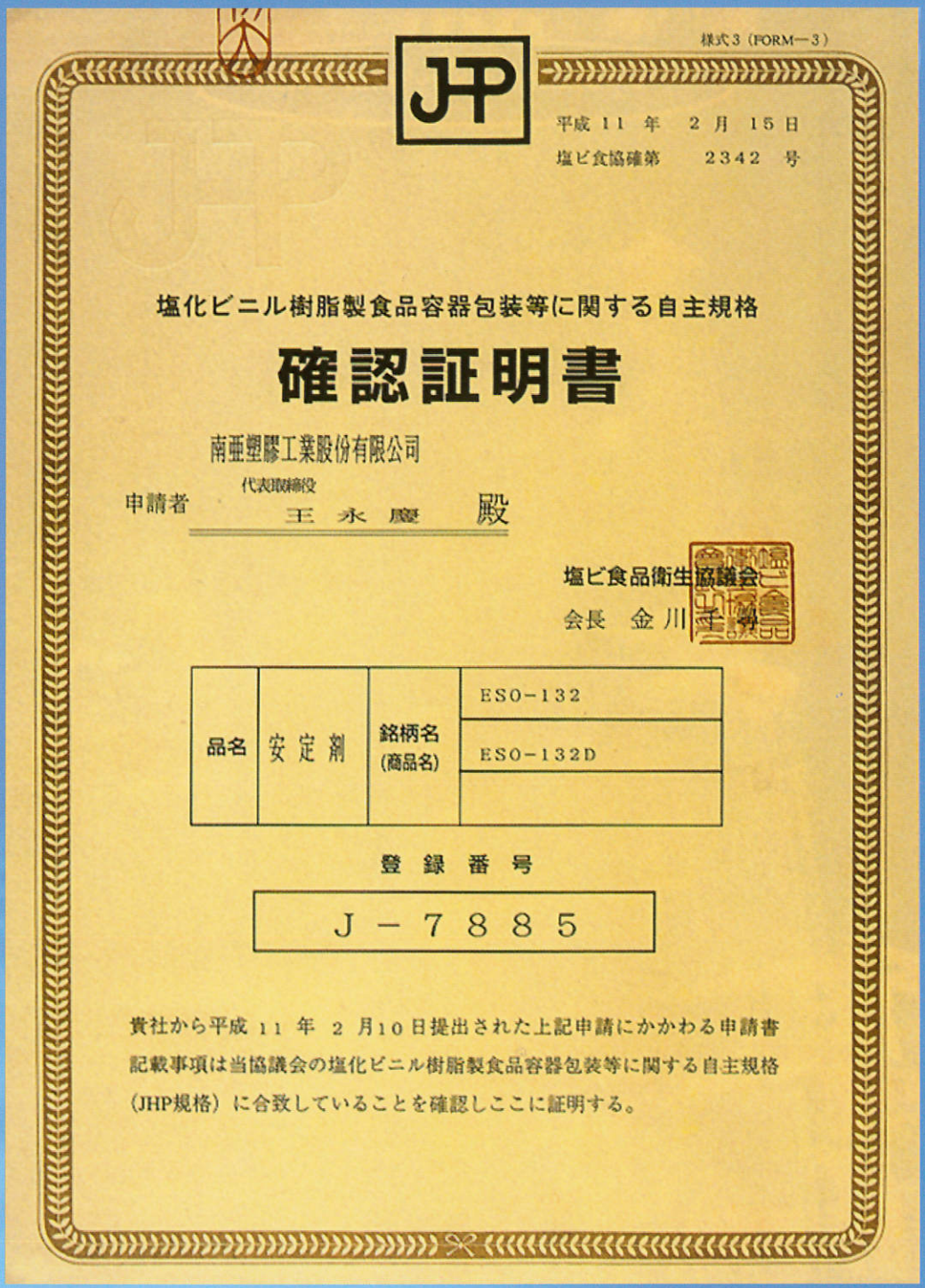


様式3（FORM－3）

JHP

平成 11 年 2 月 15 日
塩ビ食協確第 2342 号

塩化ビニル樹脂製食品容器包装等に関する自主規格

確認証明書

南亜塑膠工業股份有限公司

申請者 代表取締役 王 永 慶 殿

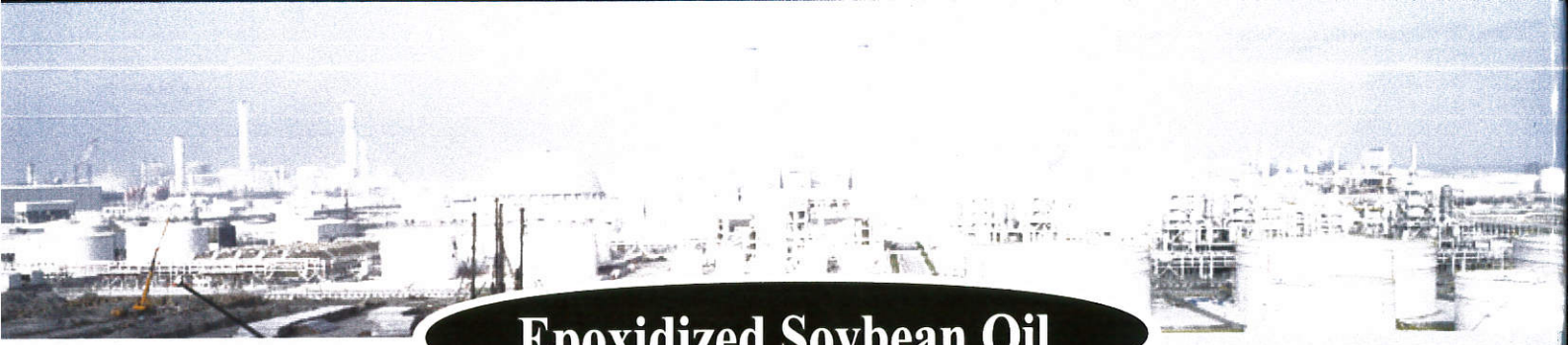
塩ビ食品衛生協議会
会長 金 川 千 尋

品名	安定剤	銘柄名（商品名）	ESO－132
			ESO－132D

登 録 番 号

J － 7 8 8 5

貴社から平成 11 年 2 月10日提出された上記申請にかかわる申請書記載事項は当協議会の塩化ビニル樹脂製食品容器包装等に関する自主規格（JHP規格）に合致していることを確認しここに証明する。



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