

Ergoplast® DOS (DEHS)

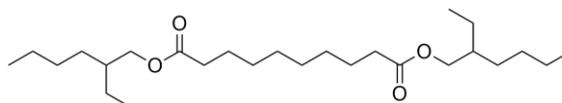
CHEMICAL NAME: bis(2-ethylhexyl) sebacate; abbr. **BEHS**
OTHER NAMES: bis(2-ethylhexyl) decanodioate; IUPAC name
 di(2-ethylhexyl) sebacate; abbr. **DEHS**
 dioctyl sebacate; abbr. **DOS**

CAS REGISTRY NUMBER: **122-62-3**

EC NUMBER: **204-558-8**

MOLECULAR FORMULA: **C₂₆H₅₀O₄**

STRUCTURAL FORMULA:



I. PROPERTIES

Ergoplast® DOS is an oily, clear and colorless liquid with no noticeable odor. It is obtained via esterification of sebacic acid with 2-ethylhexyl alcohol and as long-chain aliphatic ester is practically insoluble in water (0.2 mg/dm³ at 25 °C)¹.

Ergoplast® DOS as a plasticizer is characterized by high plasticizing efficiency, low volatility and provides the plasticized material with flexibility at low temperatures down to -50 °C. It is also highly resistant to extraction with water and solutions of typical detergents.

Thanks to its excellent lubricating properties, Ergoplast® DOS acts as an internal lubricant and improves the polymer processing performance.

The main component of Ergoplast® DOS – bis(2-ethylhexyl) sebacate is readily biodegradable in water: 84.6% in 28 days (ECHA; meth. OECD 301 B)².

II. PHYSICOCHEMICAL PARAMETERS

| Parameter | Unit | Required value | Test method |
|--|--------------------|----------------|---|
| Color in Pt – Co scale (APHA color) | Hazen units | max. 50 | PN-EN ISO 6271-1:2006 PN-C-04534-01:1981 ISO 2211 |
| Density at 20 °C | g/cm ³ | 0.912 – 0.918 | PN-EN ISO 12185:2002 PN-C-04504:1992 DIN 51 757 |
| Refractive index n_D^{20} | - | 1.449 – 1.453 | PN-C-89401:1988 DIN 51 423 |
| Acid value | mg KOH/g | max. 0.15 | PN-C-89401:1988 DIN 53402/90 |
| Flash point | °C | min. 210 | PN-EN ISO 2592:2008 |
| Volatile matter (temp. 130 °C for 2 hours) | % | max. 0.1 | PN-C-89401:1988 |
| Water content | % | max. 0.1 | PN-C-04959:1981 PN-ISO 760:2001 DIN 51777 |
| Ester content: - bis(2-ethylhexyl) sebacate - bis(2-ethylhexyl) adipate* | % by peak area | min. 99.0 | GC – FID |
| Kinematic viscosity at 40 °C | mm ² /s | 10.5 – 12.5 | ASTM D445 |

* The maximum content of adipic acid ester does not exceed 3%.

III. APPLICATIONS

Ergoplast® DOS is used as a plasticizer in the plastic processing, especially in the production of polyvinyl chloride (PVC), vinyl chloride copolymers and synthetic rubber³, such as nitrile butadiene rubber (NBR)⁴. It can be applied as a primary or secondary plasticizer, also in combination including Ergoplast® DOA [bis(2-ethylhexyl) adipate], Ergoplast® DOT [bis(2-ethylhexyl) terephthalate] as well as Ergoplast® ES (epoxidized soybean oil).

Exemplary products based on polymers plasticized with bis(2-ethylhexyl) sebacate:

- common or cold-proof electrical insulation (PVC granules)³;
- synthetic leather and floor covering³;
- specialty products – membranes⁵, gaskets and DOT 5 brake fluids.

Furthermore, Ergoplast® DOS may be a component of (frost-resistant) lubricants in turbines, compressors or pumps used in the automotive and aviation industries. Bis(2-ethylhexyl) sebacate is also applied as pressure transmitting fluid (PTF) in hydraulic machines and hydraulically operated devices⁶.

IV. PACKING AND TRANSPORT

Ergoplast® DOS transport is carried out in IBC, tank trucks and customer's unit containers. Covered means of transport should be used to transport unit containers.

It is recommended to limit exposure to sunlight and moisture with a storage temperature of up to 30 °C. The warranty period is 12 months from the date of production (for recommended storage conditions).

V. SALES CONTACT

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VI. LITERATURE REFERENCES

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4. Kuang, W., et al. (2021) *Tribology International*, 153, 106627.
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6. Sahin-Dinc, F. (2023) *Acta Physica Polonica: A*, 144(3).