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1,3:2,4-DI(P-CHLOROBENZYLIDENE)-D-SORBITOL
CAS No.: 54686-94-1
Typical Melting Range: 212–245 °C

1. Product Introduction & Context

Chemical identity (generic name)
1,3:2,4-DI(P-CHLOROBENZYLIDENE)-D-SORBITOL

Industrial classification
Organic sorbitol-based nucleating and clarifying agent (chlorinated derivative)

Typical role of the product in polymer systems
This material is used as a low-dosage organic nucleating agent to control crystallisation behaviour in semi-crystalline polymers, primarily polyolefins. Compared with non-substituted dibenzylidene sorbitols, the para-chloro substitution alters solubility, thermal response, and nucleation efficiency.

Rationale for offering the product in micronised form
In coarse crystalline form, dissolution and dispersion in polymer melts can be inconsistent. Micronisation improves dispersion reliability, reduces dependency on high shear, and supports predictable nucleation performance at industrial scale.

General problem statement addressed
Processors seeking crystallisation control and clarity improvement often encounter variability due to incomplete additive dissolution or uneven distribution. Micronised Di(p-chlorobenzylidene)-D-sorbitol addresses dispersion-driven variability without introducing inorganic fillers or high additive loadings.

2. Chemical & Physical Nature (High-Level Overview)

Chemical family and structural nature
This material is a chlorinated aromatic acetal of D-sorbitol, formed by condensation with para-chlorobenzaldehyde. The aromatic substitution increases rigidity and modifies interaction with polymer melts compared to unsubstituted DBS.

Thermal behaviour (qualitative)
The material dissolves in polymer melts at typical polyolefin processing temperatures and recrystallises upon cooling, forming an internal network that influences polymer crystallisation.

Interaction characteristics relevant to processing
Interaction is physical rather than chemical. The additive forms a self-assembled structure within the polymer matrix during cooling.

Stability under typical industrial processing conditions
Functionally stable under standard polyolefin processing conditions when residence time and temperature are properly controlled.

Detailed numerical values are intentionally excluded and are provided in the Technical Data Sheet.

3. Role of Micronisation (Particle Size Relevance)

Typical micronisation range (indicative)
Micronised grades are supplied with controlled fine particle size distributions (e.g., D90 / D100 in the low-micron range).

Impact of fine particle size

Dispersion uniformity: More homogeneous distribution in melt processing

Functional efficiency: Reliable nucleation at lower effective dosages

Optical and surface performance: Reduced risk of haze or surface defects from undissolved particles

Processing consistency: Stable batch-to-batch performance

Coarse vs micronised material behaviour
Coarse material may require elevated shear and longer residence time to dissolve fully, increasing variability. Micronised material reduces these dependencies and improves reproducibility.

4. Functional Mechanism (How the Product Works)

During cooling from the melt, Di(p-chlorobenzylidene)-D-sorbitol self-assembles into a fine fibrillar network. This network acts as a heterogeneous nucleation framework, increasing nucleation density and promoting finer polymer crystal formation. The mechanism is structural and independent of specific resin brands or formulations.

5. Key Application Areas

Polypropylene (PP)

System context	Injection moulding, clarified PP compounds, thin-wall moulded articles
Functional role	Crystallisation control, stiffness enhancement, clarity modulation
Micronisation Benefits	Ensures rapid dissolution and uniform nucleation at low addition levels

Polyethylene (PE)

System context	Selected HDPE and LLDPE moulded or compounded systems
Functional role	Modification of crystallisation behaviour
Micronisation Benefits	Reduces risk of undispersed additive affecting appearance

Specialty Polymer Compounds

System context	Custom formulations requiring controlled morphology
Functional role	Fine adjustment of crystalline structure
Micronisation Benefits	Predictable behaviour in low-dosage systems

6. Performance Benefits (Qualitative)

- More uniform crystallisation morphology
- Improved clarity or translucency relative to non-nucleated systems
- Increased stiffness without mineral fillers
- Potential reduction in processing cycle variability
- Improved surface appearance consistency
- Observed performance depends on formulation design and processing conditions.

7. Compatibility & Processing Considerations

- Compatible with common polyolefin families such as PP and PE
- Typically introduced via compounding, masterbatch, or controlled direct addition
- Processing temperatures should align with standard polyolefin practices
- Excessive overheating or extended residence time may affect colour or odour
- Dry, contamination-free handling is recommended

8. Regulatory & Compliance Position (High-Level)

- Classified as an industrial polymer additive
- Certain grades may be listed for food-contact plastic applications, subject to jurisdiction and migration limits
- Regulatory acceptance depends on purity, residual aldehydes, and supplier documentation
- Requirements vary by region and end-use sector
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End users must independently verify regulatory compliance for their specific market and application.

9. Limitations & Non-Recommended Uses

- Not intended for applications demanding ultra-high optical clarity where newer sorbitol derivatives are specified
- Limited effectiveness in highly filled or heavily pigmented systems
- Not recommended for prolonged high-temperature exposure without validation
- Not suitable for non-polymer or non-industrial uses

10. Reference to Technical Specifications

- Physical properties, particle size distribution, purity limits, and analytical data are provided in the Technical Data Sheet (TDS).
- This article intentionally avoids duplicating TDS content.

11. Handling, Storage & Safety (Article-Level)

- Store in a cool, dry place in sealed packaging
- Protect from moisture and contamination
- Handle powders using appropriate dust-control measures
- Refer to the **Material Safety Data Sheet (MSDS)** for detailed safety, health, and regulatory information

12. Disclaimer & User Responsibility

This document is intended for general technical information only. Product performance depends on formulation design, processing conditions, and end-use requirements. No express or implied warranties are provided. Users are responsible for conducting their own trials and validations prior to commercial use. Polymer Add Thailand Co., Ltd. accepts no liability arising from misuse or improper application of this product.

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