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WHY BARIUM STEARATE IS PREFERRED IN DRY-BLEND PVC SYSTEMS

Barium Stearate is widely used in dry-blend PVC formulations due to its stable behaviour across typical PVC processing conditions and its ability to perform multiple roles within a single additive system.

Thermal compatibility with PVC processing

Barium Stearate remains stable within the typical PVC processing temperature range of **180–210 °C**, covering extrusion, calendering, and injection-molding operations. This thermal alignment enables consistent processing without premature degradation or discoloration.

Efficient performance at low dosage

In rigid and semi-rigid PVC dry-blend systems, Barium Stearate is typically used at **0.3–0.5 phr**, where it contributes to lubrication and stabilization simultaneously. This allows simplified formulations without increasing overall additive loading.

Support for dry-blend stability

With typical moisture levels below **0.2 %**, Barium Stearate does not adversely affect powder flow or storage stability. It is therefore suitable for fully solid dry-blend systems without liquid carriers or pre-dispersion steps.

Contribution to thermal stabilization

During PVC processing, hydrogen chloride (HCl) is released as a degradation by-product. Barium Stearate participates in neutralizing this acidic species, extending the effective thermal stability window by approximately **20–30 °C** compared to calcium-only stearate systems.

Processing robustness

Compared to zinc-based stearates, which may show discoloration risks above **170–180 °C** in unbalanced formulations, Barium Stearate offers a wider and more forgiving processing window, remaining stable up to approximately **210 °C**.

Benefits of micronised grades

Micronised Barium Stearate typically exhibits a particle size of **D90 < 20 µm**, compared to **80–150 µm** for conventional grades. This finer particle size increases effective surface area by approximately **4–6 times**, improving dispersion in dry blends and enabling effective performance at lower addition levels. Typical dosage reduction of **20–40 %** can be achieved while maintaining consistent fusion behaviour and surface quality.

Processing consistency

Uniform dispersion achieved with micronised grades contributes to reduced agglomeration, fewer visible specks, and more stable fusion behaviour. In extrusion and calendering operations, this results in narrower torque variation and improved dimensional consistency.

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Comparative Suitability of Common Additives in Dry-Blend PVC Systems

⭐ = lowest suitability ⭐⭐⭐⭐⭐ = highest suitability

(Ratings are indicative and specific to dry-blend PVC processing conditions)

Additive / Product	**Cost Efficiency***	**Thermal Stability**	**Processing Window**	**Dry-Blend Compatibility**	**Overall Suitability**
Barium Stearate	★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Calcium Stearate	★★★★★	★★★	★★★	★★★★	★★★★
Zinc Stearate	★★★	★★	★★	★★★	★★
Calcium–Zinc Stabilizer Systems	★★	★★★★	★★★★	★★★	★★★★
Lead Stearates *(legacy)*	★★★	★★★★★	★★★★★	★★★★	★★★★
PE / Paraffin Wax	★★★★★	★	★★	★★★	★★
Organic Co-stabilizers (epoxy, phosphite, etc.)	★★	★★★★	★★★	★★	★★★

*Cost efficiency is evaluated at **typical dosage levels used in dry-blend PVC systems**, not based on additive price per kilogram.

Disclaimer

The information provided is for general technical reference only and is based on typical industry experience and published data. No warranty, express or implied, is given regarding suitability for any specific formulation or processing condition. Users are responsible for conducting their own evaluation and ensuring regulatory compliance for their intended use.

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END OF REPORT