INTERNAL SIZING COMPARISON FOR MOLDED FIBER:
AKD vs. Rosin vs. ASA

This one-page technical comparison provides a concise overview of the three dominant internal sizing chemistries used in molded fiber production: Alkyl Ketene Dimer (AKD), Rosin, and Alkenyl Succinic Anhydride (ASA). Their behavior, strengths, and limitations are influenced by molded fiber conditions such as high fines, recycled content, variable cleanliness, elevated temperatures, and low machine speeds.

Alkyl Ketene Dimer (AKD)

Summary: AKD provides durable hydrophobic sizing through covalent bonding with cellulose. It performs well in neutral to alkaline systems and offers long-term water resistance. In molded fiber, AKD is often preferred when stiffness, water holdout, and part integrity are critical.

ADVANTAGES:

+ Provides highly durable and long-lasting hydrophobicity.
+ Ideal for neutral/alkaline molded fiber furnishes (pH 6.5–8.5).
+ Supports high-strength applications with improved stiffness.
+ Not dependent on alum, simplifying control in recycled furnishes.
+ More temperature-stable for hot-press molded fiber applications.

DISADVANTAGES:

– Requires cure time; sizing develops gradually.
– Performance can drop in very dirty systems with high anionic trash.
– Overdosing can lead to deposition or foam tendencies.
– Less effective in low-pH (acidic) environments.
– Short shelf life

Rosin (Fortified Rosin / Soap-Rosin)

Summary: Rosin is an alum-dependent sizing chemistry commonly used in acidic systems. It delivers rapid on-machine sizing and is often more forgiving in dirty, recycled fiber processes. In molded fiber, rosin provides immediate water resistance, making it effective for short-retention systems.

ADVANTAGES:

+ Immediate sizing effect with no cure time.
+ Performs well in dirty furnishes with high anionic trash.
+ Cost-effective and widely available.
+ Compatible with recycled furnishes and high fines content.
+ Effective for short retention times and slow machine speeds.

DISADVANTAGES:

– Requires alum for activation, increasing system acidity.
– Less durable than AKD; sizing may diminish over time.
– Sensitive to pH and temperature fluctuations.
– Potential for deposition or stickies if not balanced.
– Higher propensity to increase foam.

Alkenyl Succinic Anhydride (ASA)

Summary: ASA is a fast-reacting, neutral-to-alkaline sizing chemistry that provides immediate hydrophobicity when properly emulsified. In molded fiber systems, ASA can deliver rapid sizing development similar to rosin, while operating without alum. However, its success is highly dependent on emulsion quality, cleanliness, and tight process control.

ADVANTAGES:

+ Immediate sizing development with no cure time.
+ Operates in neutral to mildly alkaline systems (pH 6.5–8.0).
+ Does not require alum, reducing corrosion and sulfate loading.
+ Effective for short retention molded fiber systems.
+ Lower dosage requirements compared to rosin in clean systems.

DISADVANTAGES:

– Highly sensitive to system cleanliness and anionic trash.
– Requires fresh, stable emulsification; poor emulsions reduce performance.
– Higher risk of hydrolysis, deposition, and runnability issues.
– Short shelf life compared to AKD and rosin.
– Less forgiving in recycled or highly contaminated furnishes.
– Requires more complex feeding equipment.

AKD VS. ROSIN VS. ASA — MOLDED FIBER COMPARISON

SIZING CHEMISTRY	KEY STRENGTHS	IDEAL APPLICATIONS	KEY LIMITATIONS
AKD	Durable covalent bonding; long-term water resistance; neutral/ alkaline operation.	Premium molded fiber, food service items, hot-pressed parts, high-strength products.	Requires cure time; weaker in acidic or very dirty systems.
Rosin	Immediate sizing; cost-effective; tolerant of dirty recycled furnishes.	Acidic systems, short retention lines, older equipment, high-fines recycled fiber.	Requires alum; lower long-term durability; pH sensitivity.
ASA	Immediate sizing without alum; neutral pH operation; low dosage.	Clean molded fiber systems, short retention, operations needing instant sizing.	Emulsion-sensitive; high risk in dirty or unstable systems.