



## Dry Strength Agent

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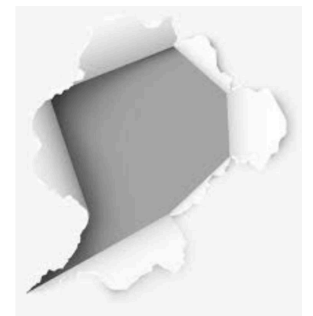
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Product Category	<ul style="list-style-type: none"> <li>• Dry Strength Agent for Paper Manufacturing</li> </ul>
Application	<ul style="list-style-type: none"> <li>• Used in paper manufacturing                             <ul style="list-style-type: none"> <li>○ Writing paper</li> <li>○ Kraft paper</li> <li>○ Tissue paper</li> </ul> </li> </ul>
Key Function(s)	<ul style="list-style-type: none"> <li>• Improve fiber-bonding amongst the other fibers</li> <li>• Optimize paper physical and mechanical strength</li> </ul>

### What is dry strength agent

A dry strength agent in paper manufacturing is a chemical additive used to enhance the strength of paper when it is dry. These agents improve the mechanical properties of paper, such as its tear strength, burst strength, and tensile strength, which are important for a variety of paper products, particularly those that need to withstand stress during use, like packaging materials, tissue paper, and writing papers.

Dry strength agents primarily work by improving the fiber-to-fiber bonding in the paper, helping the cellulose fibers stick together more effectively. The stronger the fiber bonds, the stronger the paper will be, both in terms of its ability to hold together under pressure and its resistance to breaking or tearing.



### Types of Dry Strength Agents:

#### 1. Starch-based Agents:

- Cationic Starch: One of the most commonly used dry strength agents. Cationic starch is modified with chemicals such as epichlorohydrin or quaternary ammonium compounds (like QAC) to impart a positive charge. This makes it interact more effectively with the negatively charged cellulose fibers in paper, enhancing the bond between them.
- Function: It helps increase the wet and dry strength of paper and improves retention of fibers and fillers during the papermaking process.

#### 2. Synthetic Polymers:

- Polyamide-epichlorohydrin (PAE): A widely used dry strength agent in paper production. It is a crosslinked polymer that improves both wet and dry strength by forming bonds between the fibers.
- Polyacrylamides: These can be used for dry strength, although they are more often employed as retention agents or flocculants. Stellar Unity has provided dry strength agent by this category at 20% of acrylamide and acrylic copolymers.

#### 3. Natural Polymers:

- Guar Gum and Xanthan Gum: These natural polysaccharides can be used as dry strength agents due to their ability to form gel-like structures that enhance fiber bonding.

For more information of product



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#### 4. Resins:

- Cationic Resins: Cationic resins like polyamines or polyamidoamines are used to improve the dry strength of paper by enhancing fiber bonding and improving the paper's strength properties. They are particularly useful when combined with other additives like cationic starch.

#### 5. Other Additives:

- Latex (Rubber-based): Latex can be used as a dry strength agent, particularly in applications where enhanced flexibility and durability are needed.
- Silica-based products: In some cases, these may help improve paper strength by providing reinforcement to the fiber matrix.



#### Mechanism of Action:

- Fiber Bonding: Dry strength agents enhance the inter-fiber bonding in paper. The cationic charge of some agents, like cationic starch, helps them bond more effectively with the negatively charged cellulose fibers in paper pulp.
- Crosslinking: Some dry strength agents, such as PAE, act by crosslinking the fibers, forming stronger molecular connections that increase paper strength.
- Water Retention and Fiber Retention: Many dry strength agents also help improve the retention of fibers and other additives, which contributes to improved strength and more uniform paper production.

#### Benefits of Dry Strength Agents:

- Improved Durability: Papers with enhanced dry strength are more resistant to tearing, breaking, and deformation, which is particularly important for packaging papers, tissues, and other products exposed to physical stress.
- Increased Productivity: By improving paper strength, dry strength agents help reduce the likelihood of paper breaks during the manufacturing process, leading to higher productivity and fewer defects.
- Enhanced Surface Properties: The use of dry strength agents can also improve surface characteristics, like smoothness, making paper more suitable for printing and other applications.



#### Applications:

- Packaging Papers: Dry strength agents are essential for packaging materials that need to withstand mechanical stress during transport and use, such as corrugated boxes and bags.
- Tissue Papers: In tissue products, dry strength agents help maintain the strength of the tissue while ensuring it remains soft and absorbent.
- Newsprint and Writing Paper: These products benefit from improved tensile strength, ensuring they can be printed on without tearing or breaking.

In conclusion, dry strength agents are key additives in paper manufacturing that improve the mechanical properties of paper, especially in terms of tear, burst, and tensile strength. By enhancing the fiber bonding in the paper, these agents help create more durable and high-quality paper products for a variety of applications.

Stellar Unity has connected with a large Chinese manufacturer for Paper Chemicals for only Polyamide-epichlorohydrin (PAE) category, nothing else. Therefore, it can manage the supply and minimize unnecessary cost to the paper mill. The quality system of our acrylamide-acrylic copolymer dry strength is controlled thru large scale manufacturing process to balance between performance in use and cost in operation for paper mills.

For more information of product



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