Absorbent core: The innermost layer of a disposable hygiene article that typically consists of the core matrix, a blend of fluff and superabsorbent polymer (SAP) to soak up liquid after insult and store it while the article is being worn.

Acquisition distribution layer (ADL): Located beneath the topsheet, the ADL helps rapidly direct the liquid toward the core matrix after insult, as well as distribute the liquid across the whole core area to maximize core utilization. It can also act as intermediate liquid storage before liquid is absorbed by the core matrix, in addition to acting as a barrier to avoid rewet.

Add-on: The amount of adhesive per unit of surface (typically) applied to a substrate. Add-on should typically be adjusted in order to provide a compromise between the right level of adhesive performance and excellent processing conditions.

Adhesive: Synthetic material used to assemble multiple layers or substrates together. In the specific case of a core system, it is used throughout the different layers to promote core integrity by bonding components together. Adhesive helps prevent core cracking and shifting, supports absorbency, provides structure, locks the topsheet and acquisition distribution layer together, and stabilizes the fluff and superabsorbent polymer (SAP). Adhesive can also be applied to the backsheet to help prevent core shifting and leakage during use. In cores with a fluff ratio of 50% or more, a standard construction adhesive will likely meet the need. In higher SAP ratio cores (60% or more), manufacturers often can benefit from an adhesive developed specifically for the core application. Adhesive can also be used outside of the core system, in elastic attachment applications for example.

Backsheet: A barrier film, impervious to liquids, positioned on the outside of an absorbent article. It can be breathable or non-breathable, typically made of polyethylene, often laminated with a nonwoven for extra softness.

Conditioned core cracking test: Test method developed by Bostik to evaluate core cracking in order to measure core integrity. Bostik includes a preconditioned component to our manual and machine testing to further evaluate core integrity when a disposable hygiene article is both wet and dry. Our process involves:

1. Defining an insult point on a dry article.
2. Preconditioning the article through suspension before simulating the movements of a wearer while the article is still dry.
3. Wetting the article at the defined insult point with saline solution.
4. Waiting for the saline to absorb into the core.
5. Repeating the suspension and movement simulation until a core crack appears. The result is provided as number of movements before cracking.

Watch Bostik’s conditioned core cracking test here: https://vimeo.com/233684064

Core cracking: A “crack” is a separation in the core due to gravity, movement, and/or the weight of the wet fluff and superabsorbent polymer (SAP). Any additional insults will not be well absorbed. The liquid will go into the crack and likely leak out of the disposable hygiene article.
Core integrity: The ability of the core matrix to stay in one piece, thus avoiding core cracking that creates leakage. Many factors contribute to a good core integrity, among them the core formation process, the presence and nature of a core wrap, the fluff properties and core ratio, the presence of adhesive and its application process and performance, and the amount of liquid voided.

Core matrix: This is the three-dimensional (3D) network of fibers that composes the fibrous, continuous core layer. Fibers can be cellulose fluff or synthetic nonwoven fibers. Superabsorbent polymer (SAP) particles are added to the matrix for better fluid absorption and storage. The matrix ensures good fluid management and core integrity, as well as good dispersion and fixation of the SAP particles. The matrix also provides a compressible cushion so product wearers do not feel the SAP powder when pressure is applied to the core.

Core ratio: Typically the percentage of fluff versus superabsorbent polymer (SAP) in a core matrix. As trends in thinner cores emerge and spread across the global market, changes in the fluff to SAP core ratio creates challenges for production, performance and the role of adhesive:

50% Fluff to 50% SAP
A common core structure today contains a 50% fluff to 50% SAP ratio. With this ratio, the fluff fibers are entangled to create a fairly cohesive pad, keeping the SAP in place and providing a certain level of core integrity. However, some manufacturers may want to improve core integrity. In that case, an adhesive can be used for additional enhancement.

70% SAP to 30% Fluff
When the 70% SAP to 30% fluff ratio is used, challenges become more complex. The transfer of the core from the drum to the backsheet is easily performed at 50% SAP. But at 70% SAP, a core wrap is needed to prevent the loss of SAP powder due to drum velocity and line speed. Bostik has seen that a core with a 70/30 ratio and no adhesive will fail immediately in our conditioned core cracking test because the SAP powder begins accumulating at the core bottom as soon as it is shaken. A core adhesive is the key to SAP immobilization—and performance—at this ratio.

80% SAP to 20% Fluff
Moving to an 80% SAP to 20% fluff ratio is a difficult technical step. Bostik’s research and testing has shown that a core adhesive is required simply to produce the core. Then, to achieve core integrity and reach any performance level, using the right adhesive for the core’s specific design is critical. Working with a core expert can make success quicker and easier.

Core system: A variety of intricate disposable hygiene article components that work together to prevent leakage and help keep the wearer’s skin dry. It includes the absorbent core, the topsheet and the acquisition distribution layer. A top-performing core must also be supported by a well-matched system of stretch and elastic adhesives to maintain its shape, even when wet.

Core wrap: A layer that provides containment for the fluff and superabsorbent polymer (SAP) in order to facilitate the manufacturing process (and avoid fiber or powder contamination) and/or to improve performance and stabilize the core matrix. Two types of core wraps are typically used:

1. Nonwoven wraps, which achieve faster absorption but do not reduce the risk of core cracking leakage
2. Tissue wraps, which have slower absorption but are known for helping active wearers stay drier with less rewet, are more resilient to core cracking

Options for eliminating the core wrap entirely exist to reduce weight or cost. This makes selecting the right adhesive critical for core integrity, stabilizing the core matrix and preventing core shifting.

Fluff: Cellulose fibers used as the core matrix. It is often blended with superabsorbent polymer (SAP). Fluff ensures rapid liquid absorption and wicking of liquid through capillary forces. It assists with core integrity by preventing core cracking and slumping.

Fluff free core: Absorbent core designs where fluff fibers have been completely removed. In this case, the new designs need to find solutions to perform the function of fluff, i.e. to absorb liquid instantly, to ensure wicking and to create a core matrix. Adhesive has been found essential in keeping the superabsorbent polymer (SAP) powder in place in some designs. Other designs have replaced the fluff core matrix with a nonwoven core matrix.

FLUFF-FREE CORE DESIGN & ADHESIVE PROPERTIES

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**Insult:** The discharge of bodily fluid(s) such as urine or blood.

**Leakage:** This is when the bodily fluid (or runny feces) leaks out of the absorbent article, typically at the legs or at the back, whichever is closest to the insult point. Therefore, most absorbent articles are designed with a system that contains the liquid or creates a barrier that avoids allowing the insult to reach the wearer's underwear. For example, a core design that quickly acquires liquid, distributes it throughout and keeps the liquid contained without rewetting the user is essential for protecting against leaks and supporting good skin health. A leg cuff design that is hydrophobic enough and conforms perfectly to the wearer's leg offers leakage protection.

**Leg cuffs:** Elasticized hydrophobic layers that supplement the leg elastics to conform around the legs of the wearer and avoid leakage. While not typically considered part of the core system, leg cuffs act as a barrier to allow the core matrix time for absorption. This is especially important when it comes to channeling back any liquid that may be distributed off center and redirecting it back to the core area for acquisition.

**Odor control:** The action of mitigating, eliminating and/or masking the odor generated by bodily fluids either shortly after insult or after some time. Some manufacturers are exploring options such as using activated carbon and natural elements to control product odor during use, sometimes even before use. Materials used in the core matrix also play a vital role in improving odor control after insult. Chemically modified fluff and superabsorbent polymer (SAP) may help lower pH levels and neutralize ammonia generated after urine makes contact with skin bacteria.

**Rewet:** Usually measured in grams, this is the amount of liquid that comes back from the absorbent core through the acquisition distribution layer and the topsheet to wet the skin under pressure. Core designs should allow for very minimal rewet after the initial insult to avoid the wearer from having an uncomfortable sensation of constant wet skin and protect against rashes and sores.

**Superabsorbent polymer (SAP):** A generally synthetic polymer, mostly in powder form, that has the remarkable ability to retain large volumes of fluid relative to weight, even under pressure. SAP alone absorbs liquid relatively slowly and has very poor wicking properties. To increase absorption rates in an absorbent core, SAP is combined with fluff to produce the disposable hygiene cores that the market is most familiar with today.

**Topsheet:** This layer of the core system makes direct contact with the wearer’s skin and directs the liquid rapidly toward the absorbent core after insult. Additives that promote skin health, such as lotion or aloe, are sometimes included on the topsheet. Adhesive is applied underneath the topsheet to help prevent core shifting that could compromise absorbency and core integrity. The topsheet also plays a role in preventing liquid from coming back up to wet the skin, hence reducing risk of rewet.

**Wetness indicator:** A functional adhesive and a common feature in many disposable diapers. When the wetness indicator makes contact with liquid after insult, it visually indicates that the diaper pad is wet and the product needs changing.