

Technical Brief: House Wrap Done Right - Why a Quality Weather-Resistive Barrier Matters, Woven vs. Flash-Spun, and Why the Seams Get Taped

A builder's guide to the layer behind the cladding that homeowners never see: what house wrap actually does, how interwoven polypropylene wraps differ from flash-spun high-density polyethylene (the Tyvek family), and why taping the seams is what turns a sheet of material into a continuous building system

Executive summary

House wrap is the weather-resistive barrier (WRB) installed over the exterior wall sheathing and behind the siding, brick, or other cladding. It does three jobs at once: it blocks bulk water that gets past the cladding from reaching the sheathing, it resists air movement through the wall, and it lets water vapor escape so a wet wall can dry out. A quality WRB is one of the least expensive layers in a home and one of the most consequential: when it is absent, cheap, or badly installed, the wall cavity wets and stays wet, and the results are rot, mold, and degraded insulation performance years before the cladding shows a single sign of trouble. Not all house wraps are the same product: the two dominant families - interwoven (woven) polypropylene wraps and flash-spun high-density polyethylene (DuPont Tyvek is the best-known example) - achieve their water and vapor performance in fundamentally different ways, and the differences matter in real installations. Finally, a house wrap is only as continuous as its seams, fastener penetrations, and cut openings; taping them with the manufacturer's compatible seam tape is the step that separates a water-shedding membrane from a genuine weather barrier. This brief explains each point in plain terms, then closes with the field standard Ducere Construction Services applies on every wrapped wall.

3 jobs

one layer: bulk-water barrier + air barrier + vapor-permeable drying path

2 families

interwoven polypropylene vs. flash-spun HDPE (Tyvek) - built differently, perform differently

100%

of seams, tears, and penetrations taped with compatible tape - the continuity rule

R703.1.1

the IRC section requiring a water-resistive barrier behind exterior wall envelopes

1. What house wrap actually does (and why it is not "just plastic")

Exterior cladding is the first line of defense against rain - but it is not a waterproof layer. Wind-driven rain gets behind vinyl and lap siding, penetrates at joints and corners in brick veneer, and works through nearly every cladding type during a driving storm. The WRB is what catches that water and drains it back out, while still letting the wall breathe. Its three functions:

- 1.1 Bulk-water resistance.** The wrap must shed liquid water - rain, wind-driven rain, and the water that claddings inevitably let past - protecting the sheathing, framing, and insulation from wetting. This is tested as "hydrostatic head" (the water pressure a material can resist before leaking, per AATCC 127 and similar methods) and is the single most important property. A wrap with poor water holdout is decorative.
- 1.2 Air resistance.** Air moving through a wall assembly carries moisture and energy with it. A good WRB is an air barrier material (evaluated under standards such as ASTM E1677 and ASTM E2178 for air permeance): it blocks most of that airflow, which reduces drafts, improves HVAC performance, and - critically - limits moist indoor air entering the wall cavity in winter and condensing on cold surfaces. Air-carried moisture wets walls far faster than vapor diffusion does.
- 1.3 Vapor permeability.** At the same time it blocks liquid water and air, the wrap must allow water vapor to pass outward, so any moisture that does get into the wall (from interior humidity, construction drying, or a slow leak) can

escape rather than accumulate. This is the perm rating (ASTM E96). The whole point of a WRB is that it is asymmetric in exactly the right way: tight to liquid water and air, open to vapor. Cheap wraps get this balance wrong in one direction or the other - either they soak through, or they trap moisture inside the assembly.

1.4 Why it matters. Wall assemblies fail from moisture - specifically, from wetting rates that exceed drying rates. Sustained elevated moisture in a wall cavity rots sheathing and framing, grows mold inside concealed cavities, destroys insulation R-value, and feeds corrosion at fasteners. All of it invisible until it is expensive. The WRB, together with correct flashing and ventilation, is the mechanism that keeps the drying rate ahead of the wetting rate. Code recognizes this: the International Residential Code (IRC R703.1.1) requires a water-resistive barrier behind the exterior envelope on exterior wall coverings, installed as a weather barrier over the sheathing and integrated with flashing at openings and penetrations.

THE ONE-SENTENCE VERSION

House wrap is the hidden layer that lets a wall get wet on the outside and stay dry on the inside - blocking liquid water and air while letting vapor escape - and its quality and installation discipline decide whether a wall dries out for 30 years or quietly rots for 10.

2. Interwoven vs. flash-spun: two different ways to build a wrap

The two dominant house wrap families look similar in the roll but are engineered completely differently, and the differences show up in real-world performance - especially in water holdout, air resistance, and how the material handles during and after installation.

2.1 Interwoven (woven) polypropylene wraps. These are made by cross-weaving flat polypropylene tapes into a grid and bonding or coating the grid with a thin polyethylene or polypropylene film. The weave gives them real advantages: high tensile and tear strength (they take jobsite abuse well), good dimensional stability, and often a longer UV exposure window before the material degrades in sunlight. The engineering trade-off is at the microstructure level: woven wraps achieve their vapor permeability through the coating or, in many products, through micro-perforations punched through the film. Those perforations raise the perm rating on the data sheet - and simultaneously open thousands of liquid-water pathways, which lowers effective water holdout under sustained or wind-driven wetting. Coatings can also delaminate from the weave over time, and quality varies widely between commodity woven products; some inexpensive woven wraps perform acceptably, and others are closer to a dust tarp with a brand printed on it.

2.2 Flash-spun high-density polyethylene (the Tyvek family). Tyvek HomeWrap (and the related CommercialWrap line) is not woven and not perforated. It is flash-spun HDPE: continuous fine polyethylene fibers laid in a dense, randomly bonded web, full of tortuous, interconnected air paths that are large enough for water vapor molecules to pass through but too small and too winding for liquid water to penetrate. Because the material is continuous (no punched holes, no separate coating), it maintains high liquid-water holdout **and** high vapor permeability at the same time - the asymmetric balance that defines a good WRB - and it is a strong air barrier as well. Trade-offs: it is lighter and less tear-resistant than reinforced woven wraps, so it must be fastened properly (cap nails or capped staples, per the manufacturer's instructions - not bare staples that tear the face), and its UV exposure window before degradation is limited (months, not years), so it cannot be left uncovered on a stalled job indefinitely.

2.3 How to choose between them. The honest builder's answer: pick on published performance data, not the weave aesthetics. Check the water holdout (hydrostatic head) rating, the air-permeance rating, the perm rating, the UV exposure rating, and the tensile/tear strength on the manufacturer's data sheet for the specific product - not the brand family. As a general rule, the premium non-perforated flash-spun products hold out water and air better; the quality woven products offer better tear strength, faster install on a windy site, and often longer uncovered UV life. The commodity floor of both families - thin perforated wovens - is where wall failures are bought. Ducere's approach is to

select a proven WRB appropriate to the cladding and exposure (brick veneer, lap siding, and board-and-batten have different drainage and holdout needs), and to enforce the installation discipline in Sections 3 and 4 regardless of which product the project uses.

PROPERTY	INTERWOVEN (WOVEN) PP WRAP	FLASH-SPUN HDPE (TYVEK FAMILY)
Construction	Cross-woven polypropylene tapes, coated/bonded with a film; many products micro-perforated to raise vapor permeability	Continuous flash-spun HDPE fiber web; no weaving, no coating, no punched perforations
Bulk-water holdout	Varies widely; micro-perforations open liquid-water paths; quality products coat them closed, commodity products do not	Strong - continuous microstructure blocks liquid water even under sustained wind-driven rain
Vapor permeability	High where perforated (the holes ARE the perms); coating-dependent on sealed products	High, achieved through the tortuous pore structure itself - no performance trade with water holdout
Air resistance	Varies; perforated wovens leak more air	Strong air-barrier performance
Tear/tensile strength	Excellent - takes jobsite abuse, stretches less, fastens cleanly	Lower tear strength - requires cap fasteners and careful handling; can tear at unprotected staples
UV exposure window	Often longer before degradation (product-dependent)	Limited (months); must be covered per manufacturer instructions
Best use	High-abuse sites, long dry-in schedules, exposed builds - provided a quality (non-commodity) product is chosen	Maximum water/air holdout with vapor openness; the benchmark for concealed WRB performance

3. Taping the seams: where house wrap becomes a system

A roll of house wrap is a material. A wrapped house is a system - and only if the layer is continuous. The WRB's weakest points are never the field of the sheet; they are the seams where sheets meet, the fastener holes that pin it to the wall, the cuts and tears around windows, doors, and penetrations, and the transitions to flashing at the roof line and foundation. Seam taping is the discipline that closes every one of those points.

3.1 What tape actually does here. Compatible seam tape does two jobs. First, it closes the overlap: vertical and horizontal seams are lapped per the manufacturer's instructions (commonly on the order of 6 inches on vertical seams and 4 inches on horizontal, shingle-style so upper sheets shed over lower - confirm the exact figures for the specific product), and tape keeps wind from peeling or billowing the overlap and wind-driven rain from wicking back through it. Second, and less obvious: taped seams make the WRB a far better **air barrier**. Untapped laps leak air at every seam under wind pressure; a fully taped wrap functions as a continuous air barrier material, which directly improves energy performance and comfort. On homes aiming for airtight construction, the taped WRB is part of the whole-home air-barrier strategy.

3.2 Use the right tape - this is not a duct-tape job. WRB seam tape is a pressure-sensitive acrylic or similar tape engineered to bond durably to the specific wrap material and to survive UV, heat cycles, and moisture. Using the wrap manufacturer's own tape (or one it explicitly approves) matters: adhesives formulated for polyolefin house wrap do not all bond to flash-spun HDPE, woven PP, or coated surfaces the same way. General-purpose tape ages, curls, and delaminates on an exterior wall - usually right around the first summer. Install tape on a clean, dry surface at an acceptable temperature, press it fully into the wrap (a roller helps - a quick swipe with a hand often leaves the edges unstuck), and overlap tape joints a couple of inches. Cheap tape on a quality wrap is the most common way an expensive WRB performs like a cheap one.

3.3 The details that make the difference.

Openings and penetrations. Windows and doors are cut through the wrap; the wrap itself must integrate with the window flashing so water that reaches the opening is directed back out, not into the rough opening. Slices and tears anywhere in the field get patched with tape or a manufacturer patch product - not left for the cladding to "cover."

Fasteners. Every staple or nail is a hole. Cap nails and capped staples seal against the wrap and dramatically reduce fastener leakage versus bare staples; bare staples also tear flash-spun wraps in wind during installation. Fasteners belong in the field, not within an inch of a seam edge.

Top and bottom transitions. The top of the wall WRB integrates with the wall-to-roof transition (drip cap, step flashing) and the bottom terminates over the wall flashing and weep path so water exits the assembly - never dead-ends behind cladding.

Sequencing with cladding. For absorptive claddings like brick veneer and stucco, the WRB and flashing plan must account for the cladding's own water management (weep holes, drainage mat, secondary membrane); a good WRB does not excuse a bad cladding detail, and vice versa.

THE CONTINUITY RULE

Every square foot of a wall's weather barrier is either the wrap, a taped seam, a patch, a fastener seal, or an integrated flashing transition. If any category is missing from a spot on the wall, that spot is the weather barrier's failure point - and water finds it. Tape is not decoration on a house wrap; it is what makes the sheet into the barrier.

4. The Ducere standard on wrapped walls

Ducere Construction Services applies one field standard to every exterior wall it wraps, and verifies it the same way on a custom home in Mableton as on a commercial envelope:

- 1. Product by data, not by habit.** A proven WRB selected for the cladding and exposure - water holdout, air permeance, perm rating, and UV window read off the actual product data sheet - with commodity perforated wraps excluded from the approved list.
- 2. Sheathing first.** Wrap goes over sound, dry sheathing with seams and penetrations in the sheathing addressed before the WRB runs.
- 3. Shingle-style laps per manufacturer spec.** Correct overlap at every seam, upper sheets shedding over lower, horizontal seams lapped over the course below.
- 4. Every seam, tear, and penetration taped.** Compatible manufacturer tape applied to the full lap sequence, patches on every cut and tear, and window/door openings integrated with flashing before cladding.
- 5. Cap fasteners.** Capped nails or capped staples in the manufacturer's specified pattern - no bare staples, no fasteners at seam edges.
- 6. Transitions integrated.** Top and bottom terminations lapped into the roof flashing above and the wall flashing and drainage path below, so water that enters anywhere has a continuous path out.
- 7. Documented.** The wrapped wall is photographed before cladding covers it - product installed, seams taped, openings flashed - and logged in the project's field documentation, so the WRB's quality is verifiable years later, not just asserted.

5. Quick reference: frequently asked questions

QUESTION	ANSWER
Is house wrap actually required by code?	The IRC (R703.1.1) requires a water-resistive barrier behind exterior wall coverings, integrated with flashing. Product choice within that requirement is the builder's - and quality varies enormously.
What's the real difference between woven house wrap and Tyvek?	Woven wraps are cross-woven polypropylene tapes with a bonded coating (many micro-perforated); Tyvek is flash-spun HDPE - a continuous nonwoven fiber web with no perforations, giving strong water holdout and air resistance while staying vapor-open. Woven wraps offer higher tear strength and often longer UV life. Buy on the data sheet, not the family name.
Why do perforated wraps have high perm ratings?	Because the perforations are the perms - punched holes pass vapor easily, but they also pass liquid water under sustained or wind-driven wetting, and they leak air. High perm numbers from micro-perforation come at the cost of water holdout.
Why tape the seams if they're already overlapped?	Two reasons: lap alone is not waterproof under wind-driven rain and wind pressure (it can billow and wick), and a fully taped wrap functions as a continuous air barrier - a direct energy and comfort gain. Untapped laps leak air at every seam.
Does house wrap let the wall breathe if it blocks water?	Yes - that asymmetry is the entire point. Liquid water and air are blocked; water vapor passes outward so a wet wall can dry. The perm rating (ASTM E96) quantifies the drying path. A wrap that soaks through or one that traps vapor inside both fail this balance.
How long can house wrap stay exposed before siding goes on?	Every product carries a UV exposure rating - woven wraps often longer, flash-spun wraps typically months, not years. UV-degraded wrap loses strength and must be replaced before cladding.
What does Ducere install?	A proven WRB selected per cladding and exposure, shingle-style laps per manufacturer spec, every seam and penetration taped with compatible tape, cap fasteners, openings integrated with window flashing, and the finished wrap photographed and logged before cladding covers it.

Standards referenced: IRC R703.1.1 (water-resistive barrier); ASTM E96 (perm rating); ASTM E1677 / E2178 (air barrier and air permeance); AATCC 127 (hydrostatic water resistance); manufacturer data sheets and installation instructions. Product names (e.g., Tyvek) remain the trademarks of their owners and are referenced descriptively. Informational only - not legal or engineering advice; confirm project-specific selection and detailing with a licensed contractor and the authority having jurisdiction.