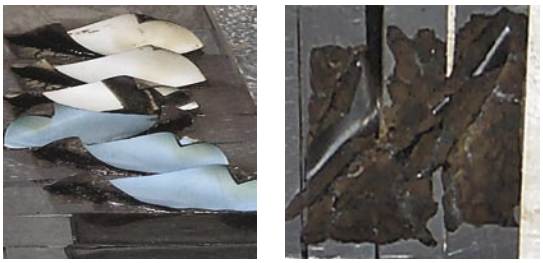
DuPont Building Science Bulletin

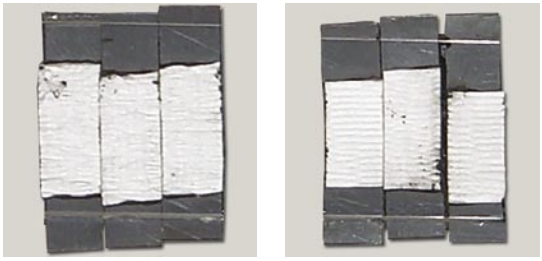
A COMPARATIVE STUDY OF PEEL-AND-STICK FLASHING TAPES

Figure 1: Asphalt Flashings at 1 week



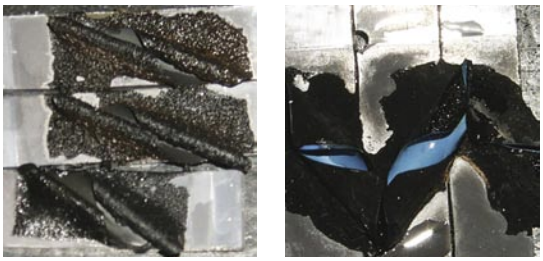
These asphalt flashings exhibit significant curl and degradation after one week exposure to UV light, heat and moisture.

Figure 2: DuPont™ Flashing Systems at 1 week



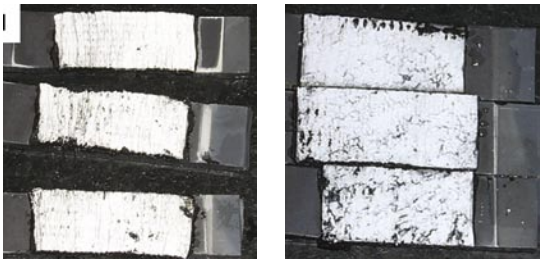
The DuPont flashings showed little effect.

Figure 3: Asphalt Flashings at 14 weeks



Most of the asphalt samples were completely destroyed after 14 weeks exposure to UV light, heat and moisture.

Figure 4: DuPont™ Flashing Systems at 14 weeks



DuPont butyl-based samples after 14 weeks exposure completely maintained their integrity as a product.

Today, the most popular flashing materials are self-adhered "peel and-stick" tapes that help to create a tight, continuous seal between framing openings and the window and door units installed in a wall. However, not all flashing tapes are created equal. DuPont flashing products are made with a premium butyl-based adhesive that in recent testing performed much better under various installed conditions than competitive products made with asphalt-based adhesive.

Testing Flashing Performance

In a series of three tests, DuPont set out to evaluate three key properties for flashing tapes:

- Weather resistance
- Thermal resistance
- Adhesion durability

Each test compared samples of widely available flashing products made with asphalt adhesives to samples of DuPont™ FlexWrap™ and DuPont™ StraightFlash™ flashing tapes made with a highly adhesive butyl sealant.

Test Series 1: Weather Resistance

Flashings may be exposed for an extended time during construction, so the materials must be able to withstand the damaging effects of weathering, such as exposure to high temperatures and humidity, intermittent rain, and ultraviolet (UV) light from the sun.

TEST CONDITIONS: Samples of both asphalt and butyl-based flashings were put in a Weatherometer for a period of 14 weeks. The Weatherometer simulates outdoor conditions by exposing materials to elevated temperature and humidity, intermittent water spray, and strong UV light.

RESULTS: After one week in the Weatherometer, the asphalt samples showed significant degradation (Figure 1) – including substantial deterioration of the adhesive, extensive curling of the top sheets, or delamination. The effect at 14 weeks is even more pronounced. Figures 3 and 4 illustrate the difference. The DuPont butyl samples showed no significant degradation and performed much better under these extreme conditions. (Figure 4).

Test Series 2: Thermal Resistance

Once siding and trim is installed, flashings will be protected from UV light, but can still be vulnerable to degradation and failure caused by thermal cycling.

TEST CONDITIONS: Butyl and asphalt flashing samples were applied to both OSB and vinyl strips, then oven-aged at 160°F to simulate surface temperatures in locations where wall surfaces can reach over 160°F on a sunny day.

RESULTS: After aging 24 hours, the top sheets on the asphalt products started to lift at the corners. After 7 days, the top sheets completely curled back (Figure 5). Without a top sheet, the integrity of the flashing is lost and the adhesive is free to flow, which may form breaks between the window flange and the wall. In addition, the adhesive appeared to react with the vinyl substrate, causing it to deform. (Figure 6)

Test Series 3: Adhesion Durability

To test the durability of the adhesion performance after heat aging and water immersion, flashing samples were subjected to tests based on the AAMA 800 voluntary test methods for caulks. The results of this test are shown in Figure 7.

TEST CONDITIONS: Asphalt and butyl-based flashing samples were applied at room temperature to three dry substrates, and these sets of flashing samples were exposed as follows:

- Set 1: aged at room temperature for two weeks.
- Set 2: oven- aged at 160°F for two weeks.
- Set 3: aged at room temperature for one week, then immersed in distilled water for one week.

RESULTS: The adhesive strength of each sample set was measured using 180 peel tests. The results chart at right compares the average peel values for all samples. Note the water immersion tests on OSB: The asphalt- based samples lost virtually all of their adhesion, while the DuPont butyl samples maintained over 85% of their room-temperature adhesive strength.

DuPont Holds its Integrity

All three of these tests demonstrate that **DuPont™ Flashing Systems consistently outperform common asphalt flashings under various installed conditions**. Asphalt-based flashings are much more susceptible to damage from UV light, heat and moisture during construction. Asphalt- based products are also prone to failures of the top sheet and the adhesive bond due to thermal cycling and extreme moisture conditions over the life of the building, while DuPont flashings remain intact under all exposure conditions.

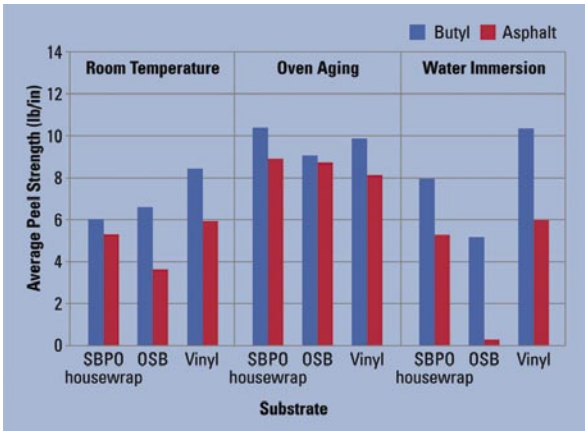
Figure 5: Butyl Samples **Asphalt Samples**

On OSB, the top sheets of the asphalt samples (three on right) curled severely after 7 days of aging at 160°F, while DuPont™ FlexWrap™ and DuPont™ StraightFlash™ butyl-based samples (left) maintained their integrity.

Figure 6: Butyl Samples **Asphalt Samples**

On vinyl, the DuPont butyl-based flashings remained intact after 7 days of aging at 160°F (two on left). However, the top sheets on the asphalt-based samples (three on right) curled back and caused the vinyl substrate to deform.

Figure 7: Peel Strength Comparison



While peel strength for all flashing samples increased with oven aging, the adhesion strength of the asphalt samples failed once the OSB substrate was immersed in water.

DuPont™
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