

Georgia-Pacific Gypsum (GP) has developed a new exterior gypsum wall panel called DensElement™ sheathing for use as a water-resistant and air barrier with GP approved tape or liquid flashing for the treatment of the joints, fasteners, openings, transitions and penetrations (the DensElement™ Barrier System). This DensElement™ Barrier System eliminates the need for building wrap, peel-and-stick, or fluid-applied treatment to the field of the board. GP expects the new system to lead to materials and labor cost savings.

Study Methodology

Home Innovation Research Labs conducted a Time-Motion study of the installation of the DensElement™ Barrier System and other common water and air barrier systems in its Upper Marlboro, Maryland research facility to compare installation time and materials used. The study consisted of complete installations of four different water and air barrier systems: two were commercially-available systems applied to DensGlass® sheathing, and two were variations of the new DensElement™ Barrier System.

Home Innovation Labs constructed a 3-story commercial building in its Maryland laboratory—the height of the building was 28 feet, and the total length of walls was 88 feet, for a total of 2,464 gross square feet of sheathed exterior wall area. The building envelope included 12 window openings and two door openings and a mix of outside and inside corners to create a realistic commercial construction setting. Home Innovation hired an experienced water and air barrier installation crew to install the four different systems, complete with window and door flashing suitable for non-flanged commercial windows and doors. Details of the four systems and installation times are shown in Table 1.

TABLE 1: Summary of Systems Evaluated

	System Description	Details of the Water & Air Barrier System	Total Installation Time (Man-Hours)	Completed System on Study Building
TRIAL 1	Building Wrap & Tape Flashing on DensGlass® Sheathing	Building wrap fastened with pneumatic cap stapler All wrap seams overlapped and sealed with 2.5-in. tape 6-in. self-adhesive flashing on all window and door openings	8 hours and 31 minutes	
TRIAL 2	Full Fluid-Applied Water & Air Barrier and Flashing on DensGlass® Sheathing	Fluid sealant applied with 20 oz. “sausage guns” onto fastener heads and panel seams Fluid sealant applied with “sausage guns” to fully flash one door and six window openings Fluid sealant applied by roller onto the entire exterior surface of the DensGlass® sheathing	10 hours and 41 minutes	
TRIAL 3	DensElement™ Barrier System with Taped Seams and Door/Window Flashing	4-in. self-adhesive flashing for the sheathing seams and corners Fluid sealant applied to fastener heads 6-in. self-adhesive flashing on all window and door openings DensElement™ Sheathing surface not treated	6 hours and 22 minutes	
TRIAL 4	DensElement™ Barrier System with Fluid-Applied Seams and Door/Window Flashing	Fluid sealant to treat fastener heads, seams, and door/window openings No treatment was required for the field of the boards DensElement™ Sheathing surface not treated	6 hours and 26 minutes	

Each of the four installation “trials” had the professional water and air barrier crews install a complete system on one-half of the building—about 1,126 net square feet of sheathed area—plus one door and six window openings. Each system was installed according to manufacturers’ instructions for non-flanged windows, including completely coating inside door and window openings with a waterproof material (fluid-applied sealant or flashing tape).

Installation time was collected by a researcher using Group Timing Technique (GTT), a time-motion methodology well suited for evaluating construction processes. Figure 1 is a summary of installation time by task for each of the four Trials, provided in man-hours. The DensElement™ Barrier Systems were installed most quickly—due to the inherent water and air barrier properties of the sheathing material which eliminated treating the entire surface with a water and air barrier coating. The time required to apply flashing on window and door openings was similar for all systems.

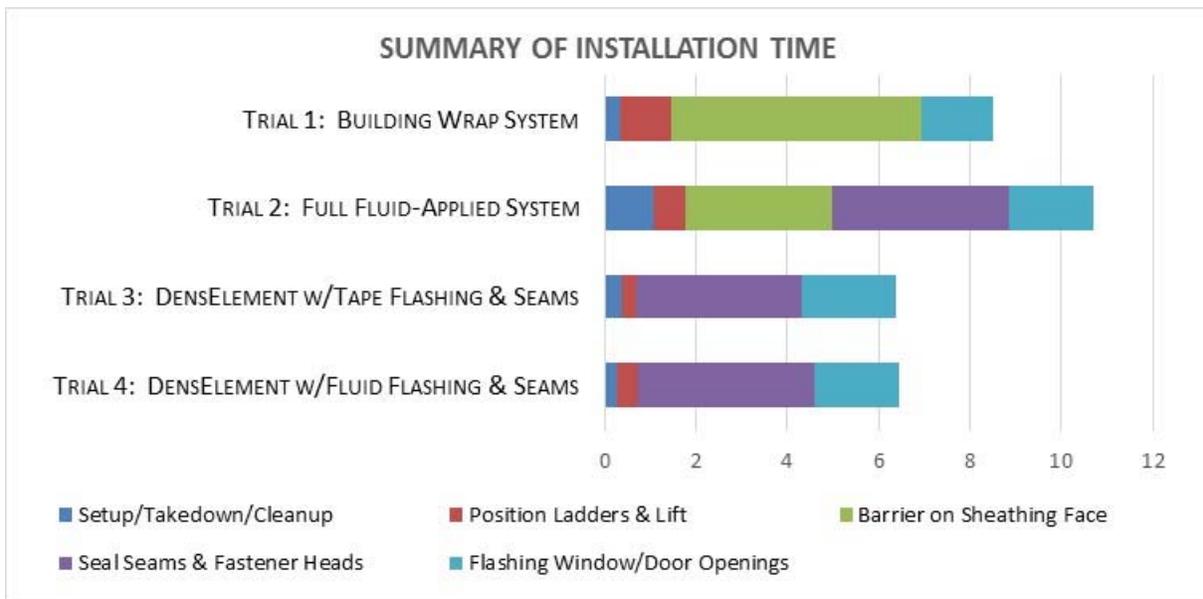


FIGURE 1: Summary of Installation Time by Category

Comparison and Application of the Study Findings

Both variations of the DensElement™ Barrier Systems (Trials 3 and 4) were installed in about 40% less time than the Full Fluid-Applied System (Trial 2) and about 25% less time than the Building Wrap System. In a follow-up interview conducted by a Home Innovation Research Labs researcher, the installation crew expressed their approval of both variations of the DensElement™ Barrier System. One reason they liked the DensElement™ Barrier System with fluid-applied sealant and flashing was the ability to complete the job using primarily one material (the sealant) and one set of tools (sausage gun applicator & putty knife).

In this research study, DensElement™ Barrier System saved about 4.26 man-hours of installation time compared to the fluid-applied water and air barrier on DensGlass®. The results presented reflect the findings on specific construction assemblies under test conditions. Actual results may vary depending on the system, the building, the installation methods and other factors.