

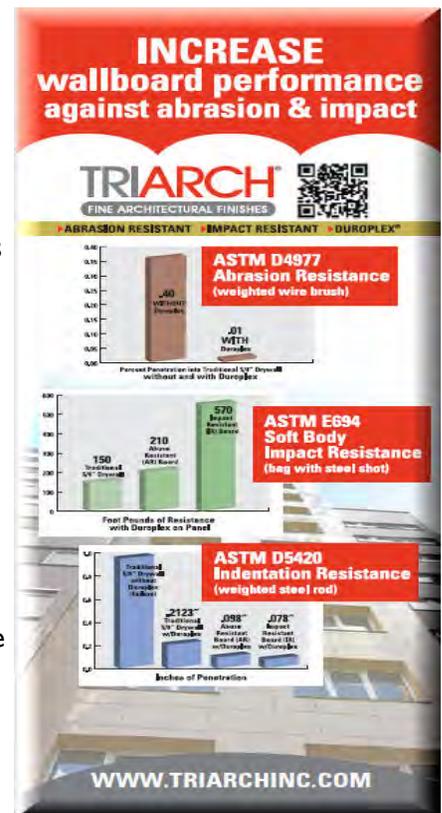
Duroplex® - Increases wallboard performance

Undoubtedly the Duroplex Wall Finish System is highly successful. Millions upon millions of square feet have been purchased and successfully installed since 1985. Most of the segments of the construction industry have benefited from Duroplex including hospitals, courthouses, airports, stadiums and office buildings. The hospitality segment enjoys the benefits of Duroplex from limited service to luxury resort; as well as retail finish out and upscale residential. Military barracks (BEQ and TLF), universities and colleges along with primary and secondary schools make up the list of projects that are reaping the benefits of having Duroplex installed at their property.

What is it about this material that appeals to the informed specifier? What is the Duroplex story that makes it the logical choice of architects, designers, construction teams and owners?

Two words provide the answer: aesthetics and performance. It is the combination of these two words that tell the Duroplex story. The following pages provide specific high occupancy project examples as well as a battery of ASTM tests to substantiate the performance of Duroplex over various wall assemblies.

A university athletic center with Duroplex Textured Float pattern.



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Busch Stadium
capacity: 49,738



Duroplex is also installed in these high traffic venues:
Reliant Stadium - Houston,
FedEx Field—Landover, MD,
TN Tech U Arena, Erwin center—University of Texas,
Martinez Center at U of Tampa, Las Vegas Monorail Stations, Ft. Lauderdale Airport, Palm Beach Airport and in the Smithsonian Museums in Washington D.C.

Duroplex pattern:
Antigua DS II in all the public areas.
Additional Duroplex finishes such as Duroplex Dimensional Metals (DDM2) were used in the press box and sky boxes.

Busch Stadium- home of the St. Louis Cardinals

Busch Stadium; home of the **St. Louis Cardinals;** Duroplex covers much of the vertical surfaces of the public accessible areas throughout the stadium. The Duroplex system, using the patterns Antigua DS II and Alexandria DMM2 are throughout the public areas and press areas. Installed in 2006, Duroplex has stood the test of time. In 2009, the Cardinals drew 3.343 million fans, with 49 sellout games - ranking 4th in MLB in terms of ticket sales.

In 2011 the Cardinals went to the World Series again. The stadium was filled to capacity throughout the season with enthusiastic fans.

Today's teams and fans demand large venues, up-to-date facilities that promote the sport and provide increased creature comforts. Designing a stadium that meets these general criteria requires careful thought in the selection of materials; materials that will look great over a long time

and in contact with the large numbers of people passing through the turnstile. Duroplex was selected for its versatility and high performance features. A variety of substrates are underneath the several hundred thousand square feet of Duroplex. Substrates include Georgia Pacific's DensGlass® high performance wall board and various forms of masonry.



Hobby Airport - major hub for Southwest Airlines



**Duroplex pattern:
Rainstone DS II in the corridors
and baggage claim areas.**

In a multi-phased expansion project, 2001-2003, Southwest Airlines upgraded an entire concourse at the busy Houston Hobby Airport. Duroplex® Flagstone DS II is featured on approximately 100,000 square feet of wall area, while Spatula Stuhli® Venetian Plaster enjoys approximately 20,000 sqft. Hobby Airport handled almost 9 million passengers in 2007, with 80% of that number going through the SWA concourse. Both materials look great after 5-7 years of service, with no maintenance. Due to continued airport operations during the renovation process, much of the work had to be completed on an “after hour basis”.

Project parameters required the installation crews work from 10:00 PM – 6:00 AM. The low VOC nature of the material and rapid cure time allowed newly installed areas to be quickly placed into service with no inconvenience to the traveling public.

The client was so pleased with the “no-maintenance” aspect of the Duroplex material and the upscale appearance that in 2010 an additional 50,000 square feet of Duroplex was installed in the terminal expansion of the baggage claim areas.



**Duroplex pattern:
Flagstone DS II in all gate areas.**



ASTM Test Explained

ASTM C 1629 test methodology was used to determine how the Duroplex system contributes to the performance of standard 5/8" wallboard, Georgia Pacific DensArmor Plus® Abuse-Resistant and Impact Resistant wallboard. The wall panels were tested uncoated - without Duroplex, and with Duroplex to measure the incremental increase in performance contributed by the Duroplex system. ASTM C 1629 is subdivided into four standardized tests designed to evaluate surface abrasion, indentation, and cavity penetration. Results are summarized into Class 1, 2, or 3 rating as defined by ASTM.

These test results utilize threshold levels of performance. For example, ASTM E 695 soft body impact test requires a **minimum resistance of 300 ft-lbs** in order to qualify as a Class 3 result. Duroplex applied to DensArmor Plus Impact-Resistant panels **scored 570 ft-lbs of resistance**. No extra rating is provided for exceeding the Class 3 criteria by 190%.

Surface Abrasion Resistance (Modified ASTM D 4977)

This test measures the ability of a gypsum panel surface to resist scratches and scuffs by subjecting the panel to 50 back and forth cycles with a wire brush. The depth of the abrasion is measured. This test was originally developed to test granule adhesion to mineral surfaced roofing, and was modified by adding a total of 25 pounds of additional weight bearing down on the brush. (“<” means “less than”)

Class 1 < 0.125" (3.2 mm), Class 2 < 0.059" (1.5mm), Class 3 < 0.010 (0.3mm)

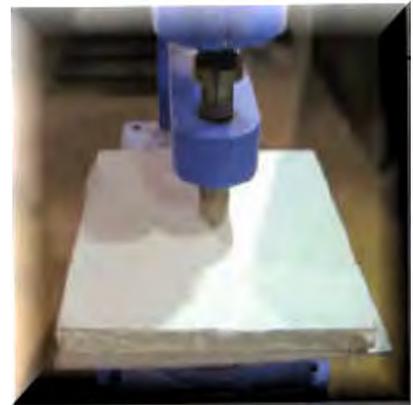


Surface Indentation Resistance (ASTM D 5420—Gardner Impact)

This test measures the ability of a gypsum panel to resist dents by a small hard object, by raising and dropping a hemi-spherical rod onto the gypsum panel. The depth of the indentation is measured. The original test was developed to test flat, rigid sheets of plastic.

Maximum Penetration to Achieve Class Level (“<” means “less than”)

Class 1 < 0.150" (3.8 mm), Class 2 < 0.100" (2.5 mm), Class 3 < 0.050" (1.3 mm)

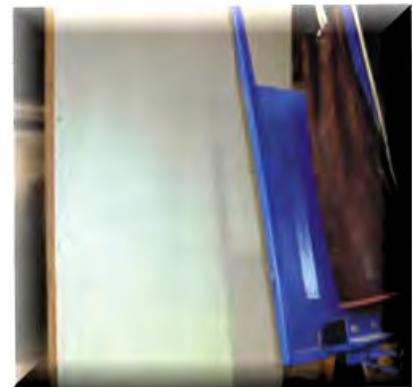


Single Drop Soft Body Impact (Modified ASTM E 695)

This test measures the ability of a gypsum panel to withstand a single impact of a heavy soft object. This test is conducted by swinging a leather bag loaded with 60 lbs of steel pellets into the panel. When the panel breaks, the height of the drop and weight of the bag are used to calculate the foot-pound measurement required to break the panel. This test was originally developed to measure relative resistance of walls, floors, and roof construction to impact testing.

Minimum Resistance level in ft-lbs to Achieve Class Level

Class 1 = 90 ft-lbs, Class 2 = 185 ft-lbs, Class 3 = 300 ft-lbs

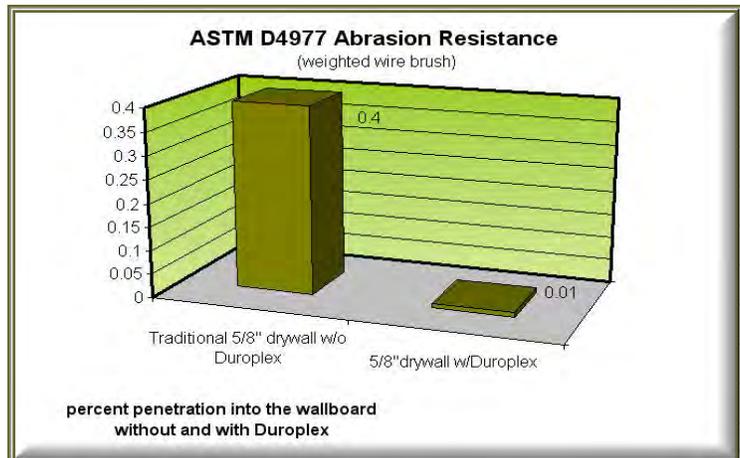


Duroplex—a performance leader in wall protection

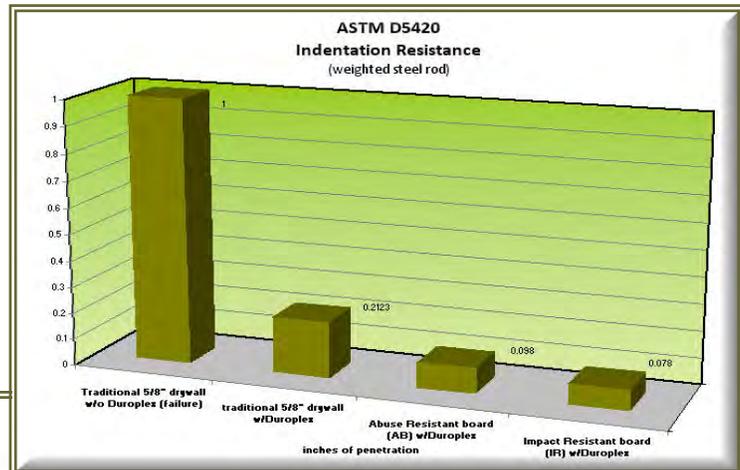
Proven performance scientifically and in the real world

Performance – a word used by many suppliers across numerous industries. We define performance for the Duroplex system as the ability to withstand the wear and tear buildings experience over time. More specifically we mean the resistance to surface abrasion and resistance to impact upon the wall surfaces that routinely happens in busy buildings. Additionally we mean exceeding applicable LEED and Green Seal criteria for low VOC products, and contributing to a positive Indoor Air Quality (IAQ). Duroplex is warranted for 10 years not to support the growth of mold on wall surfaces.

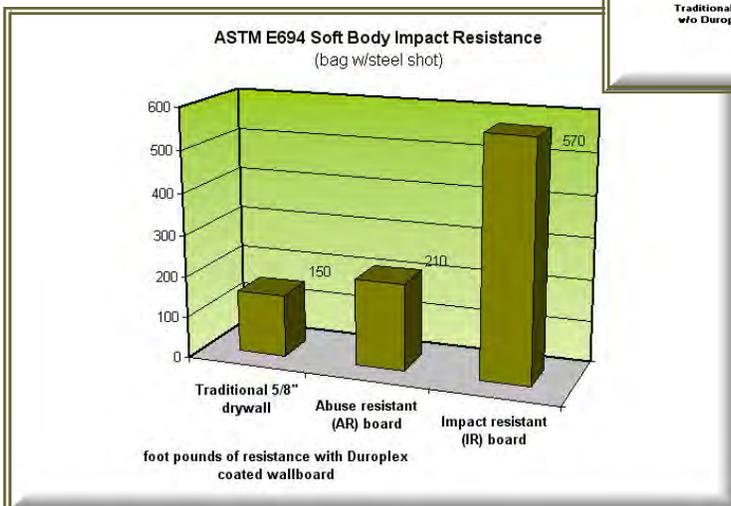
Abrasion test ASTM D4977 uses a wire brush with 25 lbs of weight. The test standard is 50 strokes, the penetration to the nearest 0.001" is measured to provide relative value of rub resistance. The accompanying chart illustrates that traditional raw or painted 5/8" drywall is more than 40% penetrated with 50 cycles. The same 5/8" drywall with Duroplex has no damage after the same 50 cycles; and after 300 cycles has only experienced a minor surface scratch at 0.01 inches. Typical 5/8" wallboard without Duroplex is below a Class 1, 5/8" wallboard with Duroplex scores a Class 3 in abrasion resistance. (less penetration is better)



Indentation test ASTM D5420 uses a weighted steel rod to measure resistance to puncturing blows. The chart shows us 5/8" raw or painted drywall fails this test, the rod penetrates into the wall cavity. With Duroplex on the same 5/8" drywall, only partial penetration occurs to 0.2123 inches. As indicated in the chart, further reductions in damage may be realized by using high performance wallboard. (less indentation is better)



Soft body impact, ASTM E694, uses a large leather bag with 60 lbs of steel ball bearings. The bag is raised to 90 degrees from the wall and swung into the wall assembly; damage is measured.



Under ASTM E 694 traditional raw or painted 5/8" drywall fails. The same wallboard with Duroplex will resist up to 150 ft.-lbs. of impact, Class 1. As with the indention test, additional gains in impact resistance may be obtained by using a tougher substrate, such as abuse resistant (AR) (Class 2) or impact resistant (IR) wall board (Class 3). Abuse-resistant wallboard with Duroplex records almost a 50% improvement at 210 ft.-lbs, and Abuse-resistant wallboard at 570 ft.-lbs. achieves almost a 4X improvement at over 5/8" wallboard with Duroplex. (higher resistance is better)

Interesting

facts:

⇒ *Duroplex is
80% as hard
as mild steel.*

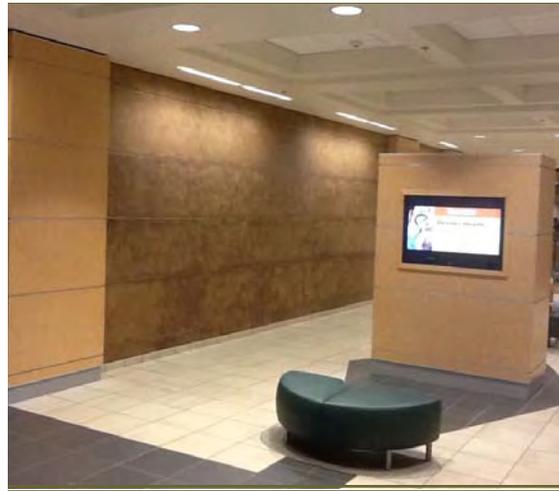
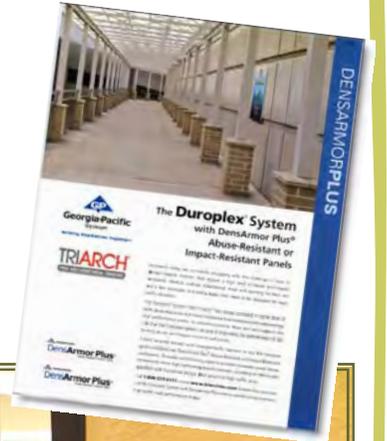
⇒ *Duroplex
carries a 10
year
performance
and mold or
mildew
warranty.*

*(see warranty statements
on our website)*

⇒ *No warranty
claim has ever
been filed
against
Duroplex in
the history of
the product.*

Full Assembly Study of Wallboard and Duroplex Finish System

The Duroplex system significantly improves the **abrasion and impact resistance** of 5/8" drywall. Additional performance results are achieved when Duroplex is placed over abuse or impact resistant wall board; **substantial gains in the resistance to both piercing and soft body impact are realized.** Ask for our brochure on Duroplex over Georgia Pacific DensArmor Plus® Abuse-Resistant and Impact-Resistant Panels



Project photos:
student lounge at TN Tech University,
Denver Health Hospital,
Holy Cross Hospital,
Garfield High School,
Yellowstone Park Visitor Center



Additional reference material on our site:

- ⇒ Datasheet T102
- ⇒ Specifications T302
- ⇒ Tests & Sustainability T1210