

Abuse resistance is an important design consideration for interior areas where a higher resistance to surface abrasion and indentation is required. Generally used in high-traffic areas, abuse-resistant drywall reduces life-cycle cost by significantly increasing the time period between periodic maintenance and improvement of the walls appearance.

## 2

## Product Description

Lafarge Protecta AR® 100 with Mold Defense™ is an abuse-resistant drywall consisting of a fiberglass-enhanced non-combustible high-density gypsum core with a reinforced heavy facing paper which guards against surface abrasion, indentation, mold and mildew. The ivory facing paper will accommodate a wide variety of decorative treatments after proper surface preparation.

Protecta AR 100 is designed for use in applications that require direct mechanical attachment to wood or metal framing or as a component of fire-rated assemblies.

To ensure optimum Type X fire resistance performance, follow recommended installation procedures. When used in a certified sound-rated assembly Protecta AR 100 will also contribute to required sound transmission classification (STC) values.

## Recommended Applications

Lafarge Protecta AR 100 is designed to meet abuse-resistant requirements of various building applications. These include:

- Schools
- Gymnasiums
- Dormitories
- Hallways
- Hospitals
- Stairways
- Hotel lobbies
- Mechanical areas
- Corridors
- Maintenance areas
- Cafeterias
- High-traffic and public areas

## Advantages

**Mold Defense\*:** Mold Defense offers enhanced protection against the growth of mold and mildew compared to ordinary drywall products. Under independent testing conditions, Mold Defense achieved an average panel score of 8 or better out of a possible 10 using ASTM D 3273.

**High abuse resistance:** Protecta AR 100 offers better impact, indentation and abrasion resistance than regular gypsum board products, thus reducing costs associated with maintenance and replacement.

**Low installation cost:** Compared to block construction, Protecta AR 100 is installed easily and quickly and does not require supporting floor slabs or footings.

**Fire Resistance:** Protecta AR 100 is formulated to perform in accordance with ASTM C 1396 and C 36, Type X and is UL labeled. (Type LGFC6A).

**Design Flexibility:** Partitions built with Protecta® AR 100 can be easily modified and relocated.

## Technical Specifications

**UL** classified for surface burning (File No. R16102)

(tested in accordance with ASTM E 84)

Flame spread = 10; Smoke developed = 0

Core combustibility

(tested in conformance with ASTM E 136) Non-combustible

**UL** classified for fire resistance (File No. R18482) as Type LGFC6A

## Installation

When installed on steel studs, 20 gage or heavier studs should be used. Studs (wood or metal) should be 16" o.c. maximum. Otherwise, install according to Gypsum Association publication GA-216 Application and Finishing of Gypsum Board, or ASTM C 840 Standard Specification for Application and Finishing of Gypsum Board. For fire-rated construction, consult GA-600 Fire Resistance Design Manual, UL Fire Resistance Directory or the Lafarge Selector Guide.

A vertical installation is generally suggested to achieve higher impact resistance performance.

## Physical Characteristics

**Core:** Non-combustible, dimensionally stable, inert gypsum enhanced with glass fibers for strength and fire resistance

**Paper:** 100% recycled; abuse, mold and mildew resistant; front and edges = ivory, back=gray

**Edge Type:** Tapered

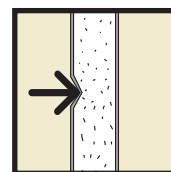
**Available Sizes:** Normal thickness = 5/8"; Normal width = 4';

Standard length = 8'-12'; Nominal weight = 2.8 lbs/ft²

# Abuse Resistance Defined

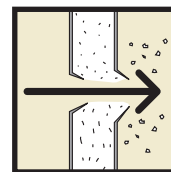
## 1) Indentation Resistance (Surface Damage)

Indentation resistance is the resistance of the surface to indentations caused by hard objects striking or being pushed into the wall surface (i.e. a pen or a key being pushed into the surface, or the edge of a cart striking into the wall). Damage is limited to the material's surface. Generally, the harder the material the higher the resistance to indentation and surface abrasion it will be.



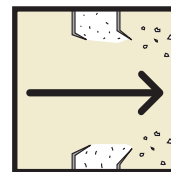
## 2) Impact Resistance (Panel Failure)

Impact resistance is the resistance of the surface material and wall as a system to impact damage, typically a hole. Sources of impact may include accidental impact from a human body due to pushing, shoving or falling; or from moving heavy objects such as furniture. Both soft-body and hard-body impact could be considered.



## 3) Security Resistance

Security resistance is resistance to forced entry through the wall for use in detention centers or for valuable protection. Ballistic resistance may also be a concern. Abuse-Resistant Drywall is NOT suitable or recommended for security resistance on it's own. However, abuse-resistant drywall can provide a damage-resistant surface and when used in combination with expanded metal or other types of backing material it may be suitable for low to medium security applications.

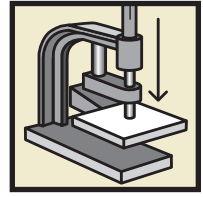


# Abuse Resistance Testing Methods

## 1) Surface Indentation - ASTM D 5420 - (Gardner Impact)

In this test, a 2 lb. steel rod with a 5/8" hemispherical head is dropped from 3 feet (72 in.-lb. energy) onto the material being tested. The depth of the resulting indentation is measured and reported. This test indicates the resistance of the material to surface indentation due to hard objects. Results are the average of 3 or more tests.

**Interpreting Results:** The lower the value the greater the resistance to surface indentation.

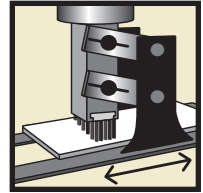


## 2) Surface Abrasion - ASTM D 4977\*\*

This test was intended for mineral-surfaced roofing products and was modified with the addition of a 25 lb. weight to provide a suitable test of the abrasion resistance of wall panel products. A wire brush is cycled across the board surface. Failure is recorded as the depth of abrasion after 50 cycles.

**Interpreting Results:** The lower the number the better the abrasion resistance.

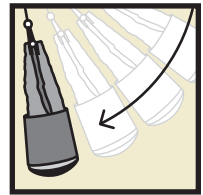
\*\*Modified with 25 lbs. of additional weight.



## 3) Soft-Body Impact - ASTM E 695

Soft-body impact resistance is tested using a leather bag loaded with 60 lbs. of steel shot that is suspended by a steel cable. The wall panel being tested is vertical and the drop height is the difference in elevation between the release height of the bag and the point of impact. Drop height is increased in increments of 6", always impacting the same location until failure. As a general rule, a wall panel more resistant to soft-body impact will also be more resistant to hard-body impact. Results are the average of 3 or more tests.

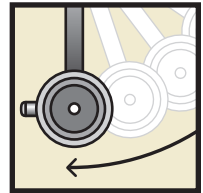
**Interpreting Results:** The higher the value the greater the resistance to impact.



## 4) Hard-Body Impact - Proposed ASTM Method

For testing, samples of drywall, 24" x 24", are mounted on 3-5/8" 20-gauge steel studs. A 2-3/4" diameter steel ram is driven into the board surface. Weight is increased until failure. A new panel is used for each impact.

**Interpreting Results:** The higher the value the greater the resistance to hard-body impact.



# Comparing Types

The following table compares the indentation and impact resistance of 5/8" Lafarge Protecta AR 100 abuse-resistant drywall with 1/2" regular, 5/8" Type X drywall and 5/8" cellulose fiber-reinforced drywall. The level of impact resistance provided by 5/8" Protecta AR 100 is approximately 4 times that of regular gypsum board and twice that of 5/8" Type X. Impact resistance could be further enhanced by using two layers of Protecta AR 100. Refer to "Interpreting Results" mentioned above in order to evaluate the table.

Drywall Type	Surface Damage Tests		Impact Damage Tests	
	Indentation ASTM D 5420	Abrasion ASTM D 4977**	Soft-Body ASTM E 695	Hard-Body ASTM Method
<b>5/8" Protecta® AR 100***</b> (ASTM C 1629 Results)	0.133" (Level 1)	0.125 (Level 1)	210 ft.-lbs. (Level 2)	70 ft.-lbs. (Level 1)
<b>5/8" Cellulose Fiber-Reinforced</b>	0.140"	30 cycles	150 ft.-lbs.	35 ft.-lbs.
<b>5/8" Type X</b>	0.230"	not available	100 ft.-lbs.	not available
<b>1/2" Regular</b>	0.300"	not available	50 ft.-lbs.	not available

\* See Mold Defense disclaimer on next page

\*\* Modified with 25 lbs. of additional weight

\*\*\* Testing performed by H.P. White Laboratory, Inc.

# Wall Construction Cost Comparison

The following table compares the relative cost of total wall assemblies including:

**A)** materials as listed in the assembly, **B)** installation labor, **C)** finishing materials and labor up to a Level 4 finish, **D)** primer and 2 coats of roller-applied paint.

Wall Construction	Costs <sup>†</sup>
<b>1/2" Regular Drywall:</b> 1 layer, each side of 3-5/8" 25-gauge steel studs at 24" o.c.	\$4.25 per sq. ft.
<b>5/8" Type X Drywall:</b> 1 layer, each side of 3-5/8" 25-gauge steel studs at 24" o.c.	\$4.33 per sq. ft.
<b>5/8" Type X Drywall:</b> 1 layer, each side of 3-5/8" 20-gauge steel studs at 16" o.c.	\$4.97 per sq. ft.
<b>5/8" Abuse-Resistant Drywall:</b> 1 layer, one side <b>5/8" Type X Drywall:</b> 1 layer, other side of 3-5/8" 20-gauge studs at 16" o.c.	\$5.35 per sq. ft.
<b>5/8" Abuse-Resistant Drywall:</b> 1 layer, each side of 3-5/8" 20-gauge studs at 16" o.c.	\$5.73 per sq. ft.
<b>5/8" Abuse-Resistant Drywall:</b> 1 layer each side (face layer) <b>5/8" Type X Drywall:</b> 1 layer, each side (base layer) 3-5/8" 20-gauge studs at 16" o.c.	\$7.05 per sq. ft.
<b>5/8" Abuse-Resistant Drywall:</b> 2 layers, each side of 3-5/8" 20-gauge studs at 16" o.c.	\$7.71 per sq. ft.
<b>Nominal 8" Concrete Block:</b> (reinforced alternate courses) <sup>††</sup> (wall only, does not include extra footing or slab cost; scaffolding cost not included)	\$8.22 per sq. ft. <sup>††</sup>

**These costs are for comparison only and may not reflect actual costs in a specific market.**

<sup>†</sup> All costs are based on R.S. Means "Building Construction Cost Data, 62nd edition", 2004. These costs represent U.S. national averages in U.S. dollars. The R.S. Means "City Cost Indexes" can be used to adjust costs to a particular location.

**\*Mold Defense™** provides extra resistance against the formation of mold, but no product may be considered "mold proof." The most effective way to avoid the formation of mold and mildew in drywall products is to limit or avoid water exposure during storage, construction and after construction is complete. Used in combination with appropriate design, handling, construction and installation practices, Mold Defense drywall can provide increased mold and mildew resistance. ASTM D 3273 is the "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber" and is performed under controlled, laboratory conditions. Actual storage, handling, construction and installation conditions may vary from the environment created in the independent lab, and the use of the product in actual conditions may not replicate the ASTM results.

For more information on Lafarge's Protecta AR 100 with Mold Defense, contact a Lafarge North America sales representative or visit us online.



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