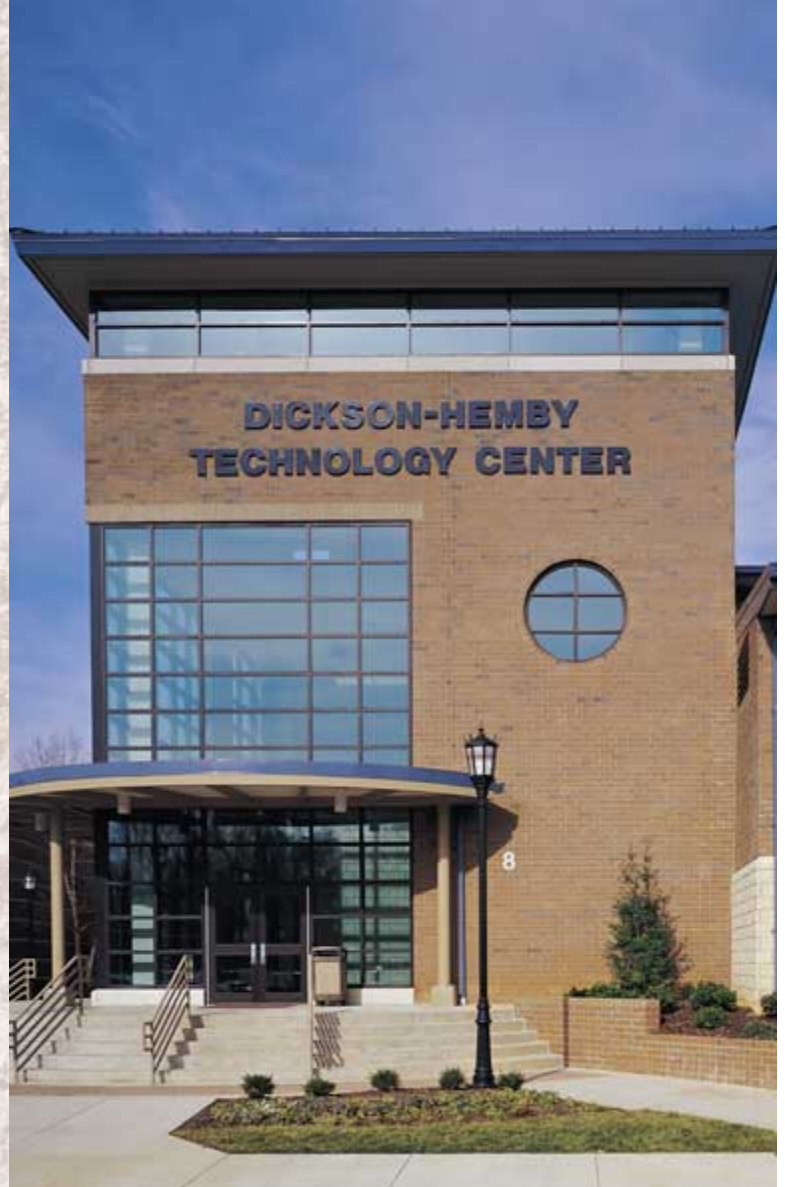


National Gypsum

09250/NGC

HI-ABUSE[®] BRAND HI-IMPACT[®] BRAND GYPSUM WALLBOARD



National 
Gypsum
COMPANY



Prison walls have to be strong. And, with Hi-Impact Brand Wallboard, strong walls can be installed as easily as regular gypsum wallboard.

So Strong It Will Change Your Idea About Wallboard.

Only The Strong Survive!

It's a tough world out there. But, National Gypsum has the wallboard that can take it. Our Hi-Abuse Brand and Hi-Impact Brand Gypsum Wallboard's are specifically designed to stand up to the bumps, scrapes and bangs so common in places like schools, health care facilities, correctional institutions, public corridors, and many other tough places.

Tough And Practical!

National Gypsum Hi-Abuse Brand and Hi-Impact Brand Wallboard may be tough, but they're also good looking, lightweight, and cost-efficient.

In the weight category, Hi-Abuse Brand and Hi-Impact Brand partition systems are just a fraction of the weight of concrete block (6 lbs./sq. ft. versus 27 lbs./sq. ft.).

That means easier, more efficient handling and lighter structural and foundation requirements.

While specific cost comparisons will depend on specific installations, you can nevertheless save from 23% to 28% per square foot in most typical installations over concrete block.

Estimated Partition Costs*

5/8" Type X Drywall	\$3.51
Hi-Abuse Brand	\$3.87
Hi-Impact Brand	\$4.31
8" unfilled concrete block	\$5.70

**Estimated partition costs: 1) Partition construction is 3-5/8" 20 gauge stud 16" o.c. with above listed finishing material both sides of the wall. 2) Construction costs from the 2000 Means Cost Construction Guide and actual contractor data. Actual cost may vary based on local labor rates and material costs. 3) The total installed cost estimate includes profit and overhead.*



Across the country, builders and specifiers have learned that Hi-Abuse Brand and Hi-Impact Brand Wallboard can stand up to any school's hard knocks.

Quick And Easy!

Since Hi-Abuse Brand and Hi-Impact Brand Wallboard are installed just like regular drywall in a single layer, installation goes quickly and easily with fewer trades involved and a lot less extra material, such as plywood, metal security mesh and sheet metal. Like regular wallboard, finishing is easy with the same array of choices you would normally have for conventional walls.

Did We Say Tough?

Of course, although Hi-Abuse Brand and Hi-Impact Brand Wallboard have all the advantages of cost-efficient installation and an attractive appearance, their biggest advantage is sheer toughness. These walls have the abrasion and impact resistance needed to stand up to tough situations, and that strength means long-term savings on repair and replacement costs.

Before You Write The Spec, Make the Call.

Hi-Abuse Brand and Hi-Impact Brand Wallboard have been specified and installed in countless facilities across the country. Their track record of proven performance is



In hospitals, Hi-Abuse Brand and Hi-Impact Brand Wallboard resist injuries and accidents that can cripple conventional wallboard.

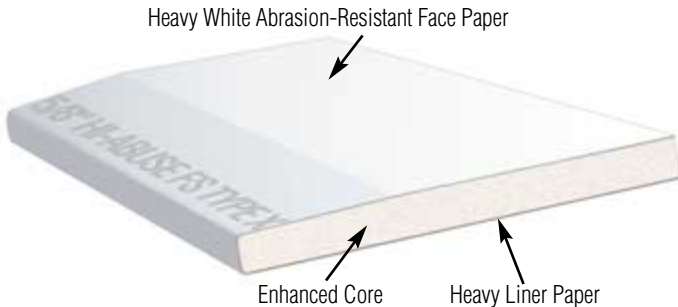
unmatched. So, if you're facing a tough situation, make the call to National Gypsum Company. After all, only the strong survive: Hi-Abuse Brand and Hi-Impact Brand Gypsum Wallboard.

HI-ABUSE[®] BRAND WALLBOARD & HI-ABUSE[®] BRAND KAL-KORE[®] PLASTER BASE

DESCRIPTION

Hi-Abuse[®] Brand Wallboard

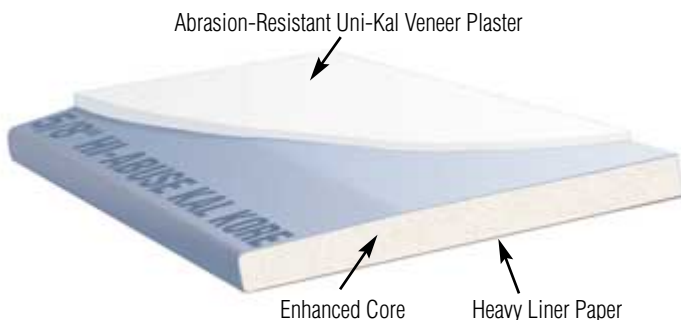
Hi-Abuse Brand Wallboard is superbly suited for wall and ceiling assemblies in high traffic, high activity areas, such as classrooms, corridors, dormitories, cafeterias, day care centers, correctional facilities and public housing, as well as industrial and commercial environments. Hi-Abuse Brand Kal-Kore Plaster Base offers the same advantages as a base for veneer plaster finishes.



Hi-Abuse Brand Wallboard panels consist of a fire resistant gypsum core encased in heavy smooth white abrasion resistant finish paper on the face side and heavy liner paper on the back side. Hi-Abuse Wallboard panels feature a specially formulated core to provide greater resistance to surface indentation and impact than fiber-reinforced gypsum panels. Long edges of the panels are tapered to allow joints to be reinforced and concealed with joint tape and joint treatment compounds. Hi-Abuse 5/8" Fire-Shield[®] Wallboard features a type X core to provide fire resistance ratings when used in tested systems.

Hi-Abuse[®] Brand Kal-Kore[®] Plaster Base

Hi-Abuse Brand Kal-Kore Fire-Shield type X Plaster Base panels consist of a fire resistive type X gypsum core encased in a heavy, blue absorptive face paper designed to permit rapid trowel application and strong bond of Uni-Kal veneer plaster and strong liner paper on the back side. Hi-Abuse Brand Kal-Kore Fire-Shield type X plaster base features a specially formulated core to provide fire resistance ratings when used in tested systems as well as greater resistance to surface indentation. Long edges of the panels are tapered to allow joints to be reinforced and concealed with Kal-Mesh Tape and Uni-Kal Plaster.



Walls and ceilings in school corridors and cafeterias are ideal applications for Hi-Abuse Brand Wallboard.

APPLICATIONS

Hi-Abuse Brand Wallboard and Hi-Abuse Brand Kal-Kore Plaster Base are ideally suited for areas where surface durability and impact resistance are major concerns. For example:

- Classrooms
- Corridors
- Dormitories
- Day care centers
- High traffic areas.

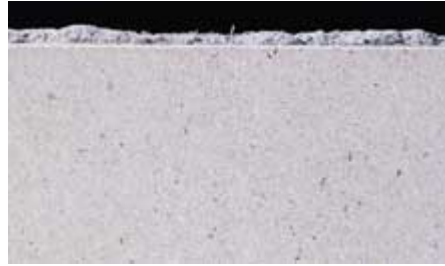
FEATURES/BENEFITS

- Provides greater resistance to surface abuse, indentation and impact than fiber-reinforced gypsum panels. The Hi-Abuse Brand's smooth, white face paper is highly resistant to scuffing when sanding wallboard joints and fasteners providing a superior surface for decoration.
- Hi-Abuse Brand Wallboard and Hi-Abuse Brand Kal-Kore Plaster Base are easily scored and snapped for quick installation. Openings and outlet boxes are cut out in the same manner as regular wallboard.
- Hi-Abuse Brand Wallboard is a lightweight, cost-efficient material that readily accepts a wide range of decorative finishes.
- Hi-Abuse Brand Kal-Kore provides the appearance and surface of conventional plaster at a lower cost than regular plastering.
- Hi-Abuse Brand Kal-Kore, when used with Uni-Kal veneer plaster, provides an excellent base over which paints and other finishes can be applied.
- The gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F (100°C) until completely calcined, a slow process.
- Expansion and contraction under normal atmospheric changes is negligible.
- 5/8" Fire-Shield Hi-Abuse Brand panels may be used where type X gypsum panels are specified in fire-rated wall and floor-ceiling assemblies (i.e., UL U300, U400, V400 and L500 series.)

5/8" NGC HI-ABUSE BRAND WALLBOARD



5/8" FIBER REINFORCED GYPSUM PANEL



5/8" FIBER-CEMENT/GYPSUM COMPOSITE PANEL



As illustrated above, Hi-Abuse Brand Wallboard scores and snaps clean, unlike fiber reinforced gypsum panels and cement/gypsum composite panels. Since Hi-Abuse Brand Wallboard installs like regular drywall, there is no additional labor required in scoring or making cutouts for electrical and plumbing fixtures. Hi-Abuse Brand Wallboard also finishes like regular drywall which provides a better finished wall than fiber reinforced gypsum panels or cement/gypsum composite panels.

TECHNICAL DATA

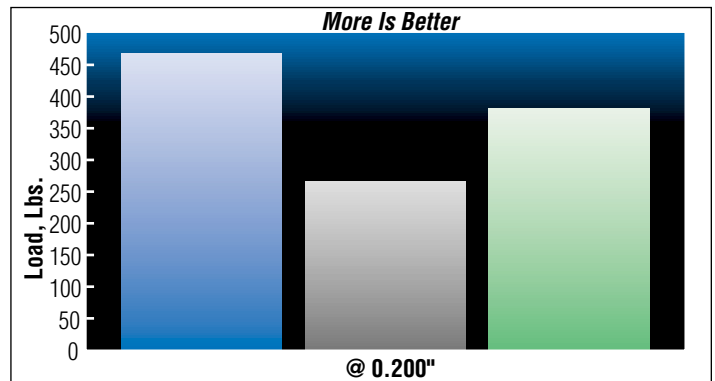
INDENTATION RESISTANCE (HARDNESS)

Modified ASTM D 1037

	5/8" NGC Hi-Abuse Brand Wallboard	5/8" Fiber Reinforced Gypsum Panel	5/8" Fiber- Cement/Gypsum Composite Panel
Load, lbs @ 0.100"	232	177	231
Load, lbs @ 0.200"	469	266	381

Procedure Summary – To measure surface indentation, a load was applied to a steel ball (diameter 0.438"), at a rate of 0.25"/minute to an indentation depth of 0.100" and 0.200".

This test measures surface hardness and the ability to withstand dents, scuffs and indentations.



■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

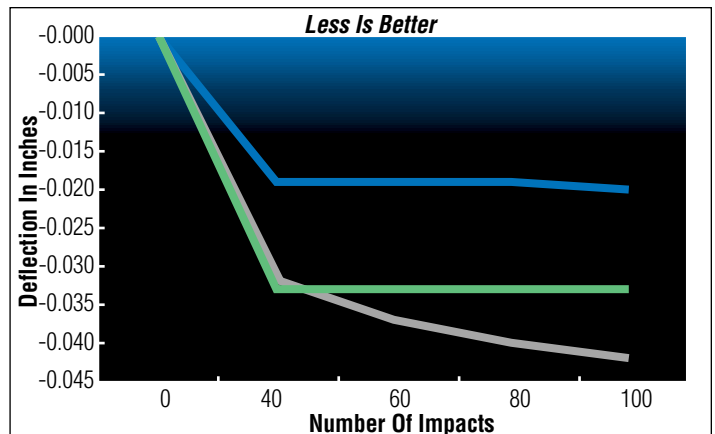
SOFT BODY IMPACT RESISTANCE

Modified ASTM E 695

Number Of Impacts	Cumulative Impact Force ft-lbs.	5/8" NGC Hi-Abuse Brand Wallboard	5/8" Fiber Reinforced Gypsum Panel	5/8" Fiber- Cement/Gypsum Composite Panel
40	916	-0.019	-0.032	-0.033
60	1374	-0.019	-0.037	-0.033
80	1832	-0.019	-0.040	-0.033
100	2290	-0.020	-0.042	-0.033

Procedure Summary – Soft body impactor (leather bag 29 "x 9") filled with sand to a gross weight of 50 lbs. The bag is supported as a pendulum, striking the panel midway between stud and mid height of test wall. Values represent deflection in inches.

This test measures the ability to withstand soft impact, such as a person's body impacting the wall.



■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

TABER SURFACE ABRASION RESISTANCE (ABRASER - SAND PAPER)

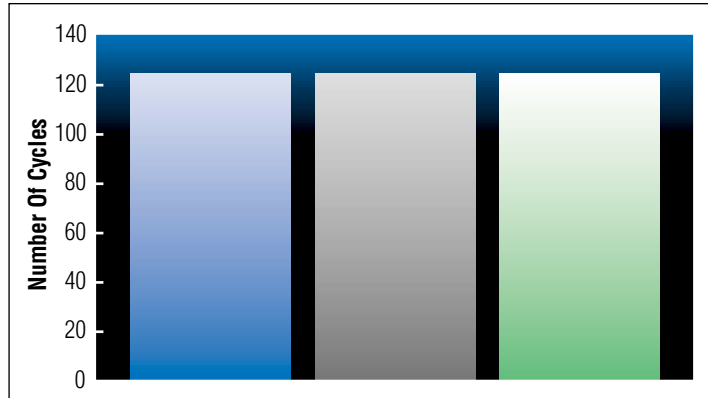
Modified ASTM D 4060

	Number Of Cycles
5/8" NGC Hi-Abuse Brand Wallboard	125
5/8" Fiber Reinforced Gypsum Panel	125
5/8" Fiber-Cement/Gypsum Composite Panel	125

Number of cycles performed without abrasion depth exceeding .01".

Procedure Summary - A Taber Abraser with two rubber wheels fitted with S-42 sand paper was activated and after every 25 cycles the surface erosion was measured.

This test measures resistance to surface abrasion caused by a rough object.



■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

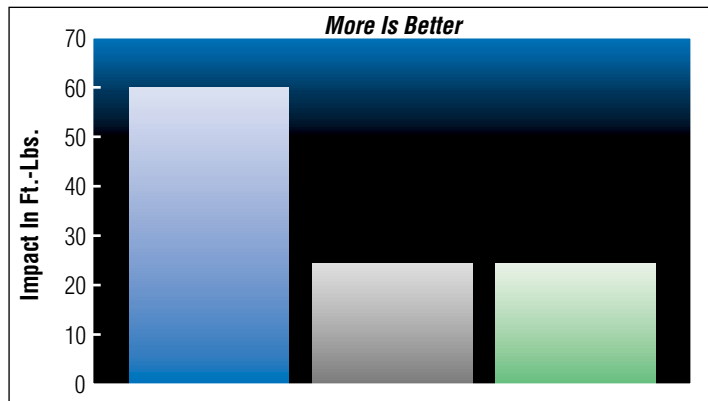
IMPACT/PENETRATION RESISTANCE RATING

Modified ASTM D 2394

	5/8" NGC Hi-Abuse Brand Wallboard	5/8" Fiber Reinforced Gypsum Panel	5/8" Fiber-Cement/Gypsum Composite Panel
Impact/Penetration Rating (ft.-lbs.)	60	24	24

Impact/penetration ratings indicate the maximum force in foot-pounds resisted in a single drop without penetration through the board. When impacted by a 24- pound 5-1/2" diameter, hemispherical steel projectile, 5/8" Fire-Shield type X Hi-Abuse Brand Wallboard applied vertically to 20 gauge 3-5/8" steel studs spaced 16" o.c. with 1-1/4" long, type S screws spaced 8" o.c. along edges and 12" o.c. in the field of the board will resist an impact force of 60 foot-pounds without penetration.

This test measures the ability to withstand the impact of a large object such as a hospital gurney or utility cart.



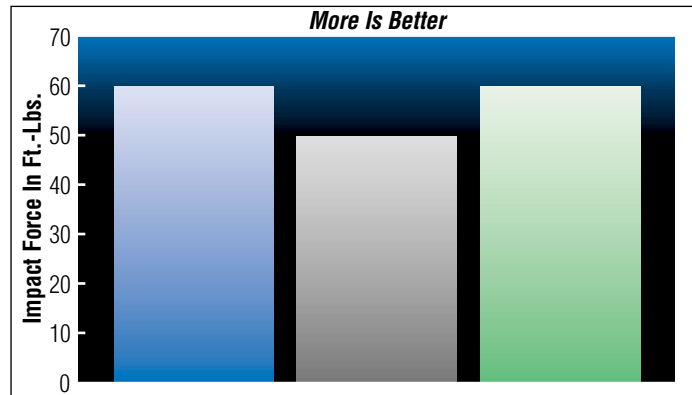
■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

SMALL PROJECTILE IMPACT TEST

	Impact Force In Ft.-Lbs.
5/8" NGC Hi-Abuse Brand Wallboard	60
5/8" Fiber Reinforced Gypsum Panel	50
5/8" Fiber-Cement/Gypsum Composite Panel	60

Procedure Summary - A 2'x2' test wall is securely clamped to a rigid test frame and impacted with a ram mounted on a pendulum which is faced with a nominal 2 1/2" pipe cap. The **maximum** impact force that the sample can withstand without penetration through the face of the sample is reported in foot-pounds.

This test measures the ability to withstand the impact of a small, hard object such as a hammer or heel of a boot.



■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

3M SURFACE ABRASION RESISTANCE (ABRASER - WIRE BRUSH)

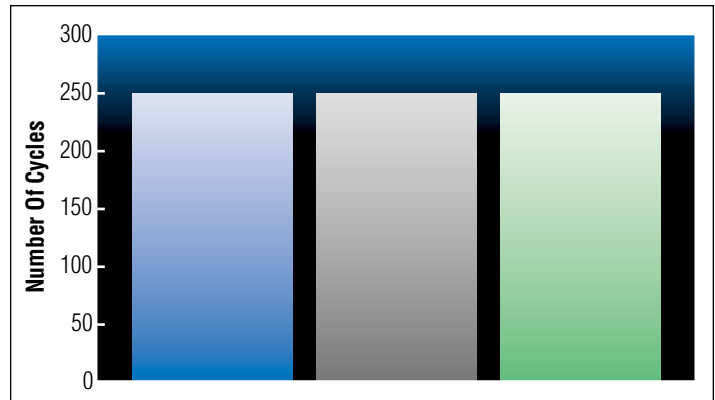
Modified ASTM D 4977

	Number Of Cycles
5/8" NGC Hi-Abuse Brand Wallboard	250
5/8" Fiber Reinforced Gypsum Panel	250
5/8" Fiber-Cement/Gypsum Composite Panel	250

Number of cycles performed without abrasion depth exceeding .001".

Procedure Summary - A 3M Granule Embedding Test Machine with wire brush was activated and after every 50 cycles (50 forward and 50 back strokes) the surface erosion was measured.

This test measures resistance to surface abrasion caused by a wire brush.



■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

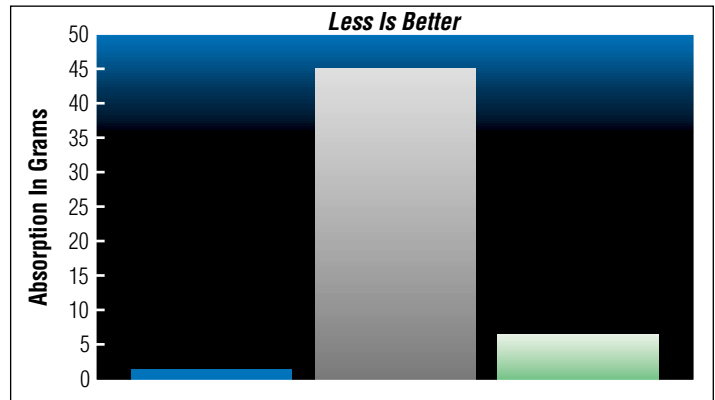
MOISTURE ABSORPTION

Modified ASTM D 3285

	Absorption In Grams
5/8" NGC Hi-Abuse Brand Wallboard	1.37
5/8" Fiber Reinforced Gypsum Panel	45.04
5/8" Fiber-Cement/gypsum Composite Panel	6.34

Procedure Summary - To measure water absorption, a Cobb Ring was clamped to the panel surface, filled with a 1" head of 70° F water for 1 hour and the moisture absorption calculated by weight difference.

This test measures surface absorption which effects the ability to withstand moisture on jobsite conditions and provides an indication of the amount of paint required to finish the surface to an acceptable level.



■ 5/8" NGC Hi-Abuse Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel ■ 5/8" Fiber-Cement/Gypsum Composite Panel

TECHNICAL DATA

Sizes & types

Width: 4' (1219 mm)

Lengths: 8' through 12' (2438 mm-3658 mm)

Thickness: 5/8" type X (15.9 mm), 1/2" (12.7 mm) (Hi-Abuse Brand Wallboard Only)

Edges: Tapered

Surface Burning Characteristics (Wallboard & Plaster Base)

ASTM E 84

Flame spread: 15

Smoke developed: 0

Fire resistance ratings represent the results of tests on assemblies made up of specific materials in a specific configuration. When selecting construction designs to meet certain fire resistance requirements, caution must be used to insure that each component of the assembly is the one specified in the test. Further, precaution should be taken that assembly procedures are in accordance with those of the tested assembly. (For copies of specific tests, call 1-800-NATIONAL.)

5/8" Fire-Shield Hi-Abuse Brand panels may be used where type X gypsum panels are specified in fire-rated wall and floor-ceiling assemblies (i.e., UL U300, U400, V400 and L500 series.)

LIMITATIONS

Hi-Abuse Brand Wallboard

- Exposure to excessive or continuous moisture and extreme temperatures should be avoided.
- Not recommended where it will be exposed to temperatures exceeding 125°F (52°C) for extended periods of time.
- Should not be used as a base for tile or wall panels in tub and shower enclosures.
- Must be stored off the ground and under cover. Sufficient risers must be used to assure support for the entire length of the wallboard to prevent sagging.

Hi-Abuse Brand Kal-Kore

- Veneer plaster systems are to be installed with maximum deflection criteria of L/240.
- When Uni-Kal veneer plaster is applied, do not install Hi-Abuse Brand Kal-Kore Plaster Base too far in advance of the plastering, since the bond can be adversely affected if the face of the panels becomes faded from light. If Hi-Abuse Kal-Kore has been faded, apply Kal-Kote Base Plaster or a bonding agent to obtain a good bond.

ACCESSORIES

Hi-Abuse Brand Wallboard

- Fasteners: drywall screws
- Joint tape
- Joint compound
- Cornerbead
- Trims
- Casing beads
- Furring channels
- E-Z Strip control joints
- .093 zinc control joint

Hi-Abuse Brand Kal-Kore Plaster Base

- Kal-Mesh to reinforce joints and interior angles
- Kal-Korner Bead
- Expanded Veneer Cornerbead
- Veneer L Trim Casing Bead
- Veneer J Trim Casing Bead
- E-Z Strip Control Joint
- Fasteners: type S Screws - 1-1/4" for single layer and 1-5/8" for outer layer in two-ply application to 3-5/8", 20 gauge screw studs.

INSTALLATION

Hi-Abuse Brand Wallboard

- Installation of Hi-Abuse Brand Wallboard should be consistent with methods described in Applicable Standards. For best impact performance, use vertical application.
- For best painting results, all surfaces, including joint compound, should be clean, dust-free and not glossy. To improve fastener and joint concealment, a coat of a quality drywall primer is recommended to equalize the porosities between surface paper and joint compound. The selection of a paint to give the specified or desired finished characteristics is the responsibility of the architect or contractor. Hi-Abuse Brand wallboard that is to have a wall covering applied to it should be prepared and primed as described for painting.
 - Gypsum Association GA-214, Recommended Specification for Levels of Gypsum Board Finish, should be referred to in order to determine the level of finishing needed to assure a surface properly prepared to accept the desired decoration.

Hi-Abuse Brand Kal-Kore Plaster Base

- Installation of Hi-Abuse Kal-Kore Plaster Base should be consistent with methods described in Applicable Standards.
- Plaster base job site conditions of temperature and humidity, mineral content of water and variances in aggregates often cause shading discolorations in the plaster. Therefore, the veneer plaster should not be considered a finished product. Plaster should be painted or decorated in some other manner. Paint manufacturers should be consulted as to compatible products. National Gypsum recommends alkali-resistant primers formulated for use over new plaster. High build, heavy duty and special purpose coatings such as Epoxy are not recommended over veneer or job gauged lime putty finishes.

APPLICABLE STANDARDS

Hi-Abuse Brand Wallboard

ASTM C 840

National Gypsum Co.
Gypsum Construction Guide

Hi-Abuse Brand Kal-Kore Plaster Base

ASTM C 843

ASTM C 844

National Gypsum Co.
Gypsum Construction Guide

SPECIFICATIONS

The following paragraphs are for insertion into sections of generic specifications or generic/proprietary specifications covering gypsum wallboard products. The National Gypsum product name follows the generic description in parentheses.

PART 2 PRODUCTS

A. Fire/Abuse-Resistant Gypsum Board: A gypsum core wall panel with additives to enhance fire resistance, surface indentation resistance, and impact resistance of the core and surfaced with abrasion-resistant paper on front and long edges with heavy liner paper bonded to the back side; and complying with ASTM C 36/C 1396, type X (Hi-Abuse Brand Fire-Shield type X Wallboard)

1. Thickness: 5/8 in.
2. Width: 4 ft.
3. Length: 8 ft. through 12 ft.
4. Edges: tapered
5. Impact Resistance: No failures after 100 impacts when tested in accordance with ASTM E 695, modified.
6. Indentation Resistance: Not less than the following loads to produce the indicated depth of the surface indentation when produced in accordance with ASTM D 1037, modified;
 - a. 0.100 in.: 232 lbs
 - b. 0.200 in.: 469 lbs.
7. 3M Surface Abrasion Resistance: Not greater than 0.001 in. when tested at 250 cycles in accordance with ASTM D 4977, modified.
8. Taber Surface Abrasion Resistance: Not greater than 0.010 in. when tested at 125 cycles in accordance with ASTM D 4060, modified.
9. Impact/Penetration Resistance Rating: Not less than 60 ft.-lbs. when tested in accordance with ASTM D 2394, modified.



Hi-Abuse Brand Wallboard provides the perfect solution for high traffic areas such as hallways and corridors.

HI-IMPACT® BRAND WALLBOARD & HI-IMPACT® BRAND KAL-KORE® PLASTER BASE

DESCRIPTION

This is one tough wallboard. By combining the surface toughness of Hi-Abuse Brand Wallboard with the strength of Lexan,* National Gypsum has created a wallboard that can really stand up to scrapes and hard knocks. The newly improved Hi-Impact Brand Fire-Shield type X Wallboard provides the maximum combination of abrasion resistance and impact/penetration resistance for those areas faced with exceptionally high levels of wear and tear. Here's a wallboard that can go in places you never dreamed gypsum wallboard could go before.

Hi-Impact Brand Wallboard

As strong and tough as it is, Hi-Impact Brand Wallboard is as easy to use and install as regular gypsum wallboard. Less expensive and labor intensive than concrete block and fiber-reinforced gypsum panels, the original Hi-Impact Brand Wallboard has quickly become the preferred choice of architects and contractors. Now, that original is even better and tougher with the addition of improved surface abrasion resistance. Thus, improved Hi-Impact Brand Fire-Shield type X Wallboard is superbly suited for all those really tough jobs, such as schools, correctional facilities, dormitories, hospitals, mass transit facilities, public housing, common areas and retail separation walls.

Hi-Impact Brand Wallboard panels are backed with Lexan substrate and are available in four increasingly higher levels of impact resistance:

1. Hi-Impact Brand 1000 with a 0.010" Lexan substrate
2. Hi-Impact Brand 2000 with a 0.020" Lexan substrate
3. Hi-Impact Brand 3000 with a 0.030" Lexan substrate
4. Hi-Impact Brand 8000** with a 0.080" Lexan substrate

** Hi-Impact Brand 8000 is manufactured with heavy natural-finish paper on the face side.

And, just like regular wallboard, Hi-Impact Brand Wallboard can be cut and installed quickly; so painting, other decoration and the installation of most metal and wood trim can begin almost immediately.

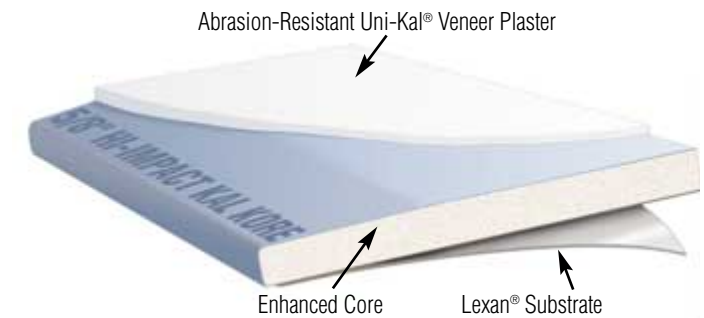
With Hi-Impact Brand Wallboard, now tough walls can still be good looking.

Each 5/8" panel consists of a fire resistive type X gypsum core encased in heavy, smooth, white abrasion-resistant paper on the face side and strong liner paper on the back side. Lexan substrate is bonded to the back side of the panel to provide additional impact/penetration resistance. Long edges of the panels are tapered to allow joints to be reinforced and concealed with National Gypsum Joint Tape and Joint Treatment Compounds.



Hi-Impact Brand Kal-Kore Fire-Shield type X Plaster Base

For those applications where the look and feel of veneer plaster is preferred, Hi-Impact Brand Kal-Kore Fire-Shield type X Plaster Base provides comparable impact/penetration resistance. Each panel consists of a fire resistive type X gypsum core encased in a heavy blue absorptive face paper designed to permit rapid trowel application and a strong bond of Uni-Kal veneer plaster. Like Hi-Impact Brand Wallboard, it too is backed with Lexan substrate to the back paper.



APPLICATION

Hi-Impact Brand Wallboard is ideally suited for those areas where both surface durability and resistance to impacts and penetrations are a vital concern.

- Schools
- Hospitals
- Detention Centers
- Prisons

FEATURES/BENEFITS

- Lightweight, cost-efficient material that readily accepts a wide range of decorative finishes.
- Resistance to abrasion, indentation and penetration superior to fiber-reinforced gypsum panels.
- Hi-Impact Brand Fire-Shield Wallboard is easily cut for quick installation, permitting painting or other decoration and the installation of most metal or wood trim almost immediately.
- The gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F (100°C) until completely calcined, a slow process.
- Expansion and contraction under normal atmospheric changes is negligible.
- Resists scuffing during installation for a superior surface for decoration.
- Cuts and scores like regular wallboard.

* Lexan® is registered trademark of General Electric Company

LIMITATIONS

Hi-Impact Brand Wallboard

- Exposure to excessive or continuous moisture and extreme temperatures should be avoided. Hi-Impact Brand products are not recommended where they will be exposed to temperatures exceeding 125°F (52°C) for extended periods of time.
- Should not be used as a base for tile or wall panels in tub and shower enclosures.
- Not recommended for use on the interior side of exterior walls in hot, humid climates such as the Southern Atlantic and Gulf Coast areas.
- Listed impact/penetration ratings apply to walls constructed with Hi-Impact Brand Wallboard applied with long edges parallel to and centered over minimum 20 gauge framing members spaced a maximum of 16" o.c.
- Not recommended to be used over kraft-faced insulation or other vapor retarders.
- Must be stored off the ground and under cover. Sufficient risers must be used to assure support for

the entire length of the wall-board to prevent sagging.

- When using Hi-Impact Brand 8000 Wallboard special consideration should be given when ordering door frames to allow for the additional width of the wall system due to the 0.080" Lexan backing.

Hi-Impact Brand Kal-Kore Plaster Base

- Veneer plaster systems are to be installed with maximum deflection criteria of L/240.

- When Uni-Kal veneer plaster is applied, do not install Hi-Impact Brand Kal-Kore Plaster Base too far in advance of the plastering, since the bond can be adversely affected if the face of the panels becomes faded from light. If Hi-Impact Kal-Kore has been faded, apply Kal-Kore Base Plaster or a bonding agent to obtain a good bond.

TECHNICAL DATA

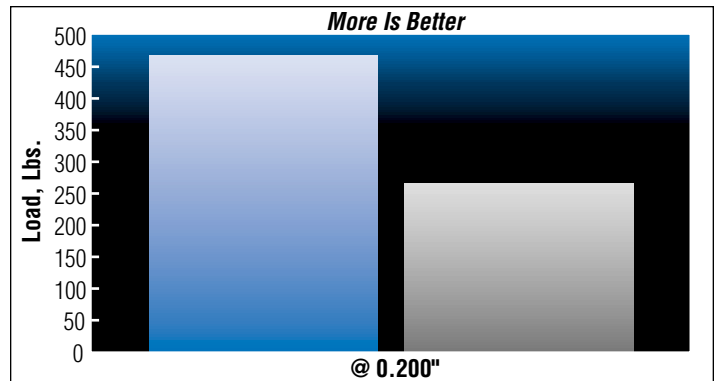
INDENTATION RESISTANCE (HARDNESS)

Modified ASTM D 1037

	5/8" NGC Hi-Impact Brand Wallboard	5/8" Fiber Reinforced Gypsum Panel
Load, lbs @ 0.100"	232	177
Load, lbs @ 0.200"	469	266

Procedure Summary – To measure surface indentation, a load was applied to steel ball (diameter 0.438"), at a rate of 0.25"/minute to an indentation depth of 0.100" and 0.200".

This test measures surface hardness and the ability to withstand dents, scuffs and indentations.



■ 5/8" NGC Hi-impact Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel

3M SURFACE ABRASION RESISTANCE (ABRASER - WIRE BRUSH)

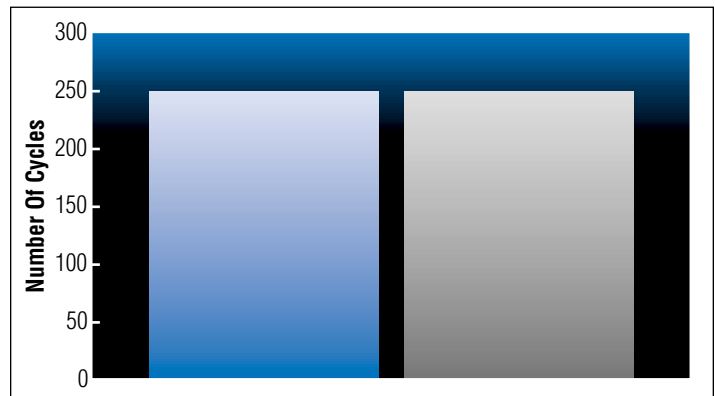
Modified ASTM D 4977

	Number Of Cycles
5/8" NGC Hi-Impact Brand Wallboard	250
5/8" Fiber Reinforced Gypsum Panel	250

Numbers of cycles performed without abrasion depth exceeding .001".

Procedure Summary - A 3M Granule Embedding Test Machine with wire brush was activated and after every 50 cycles (50 forward and 50 back strokes) the surface erosion was measured.

This test measures resistance to surface abrasion caused by a wire brush.



■ 5/8" NGC Hi-Impact Brand Wallboard ■ 5/8" Fiber Reinforced Gypsum Panel

TABER SURFACE ABRASION RESISTANCE (ABRASER - SAND PAPER)

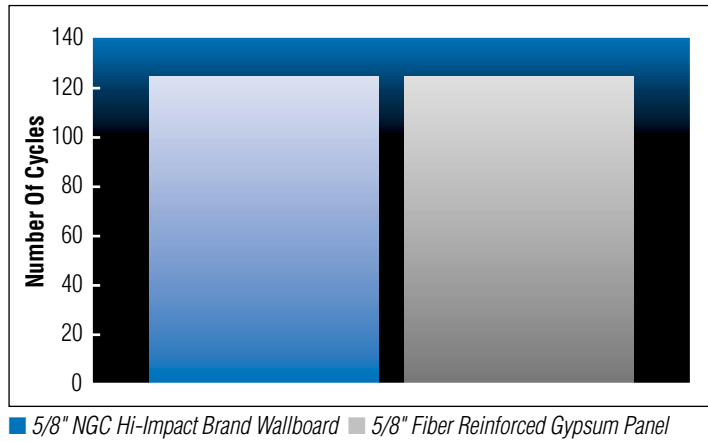
Modified ASTM D 4060

	Number Of Cycles
5/8" NGC Hi-Impact Brand Wallboard	125
5/8" Fiber Reinforced Gypsum Panel	125

Numbers of cycles performed without abrasion depth exceeding .01".

Procedure Summary - A Taber Abraser with two rubber wheels fitted with S-42 sand paper was activated and after every 25 cycles the surface erosion was measured.

This test measures resistance to surface abrasion caused by a rough object.

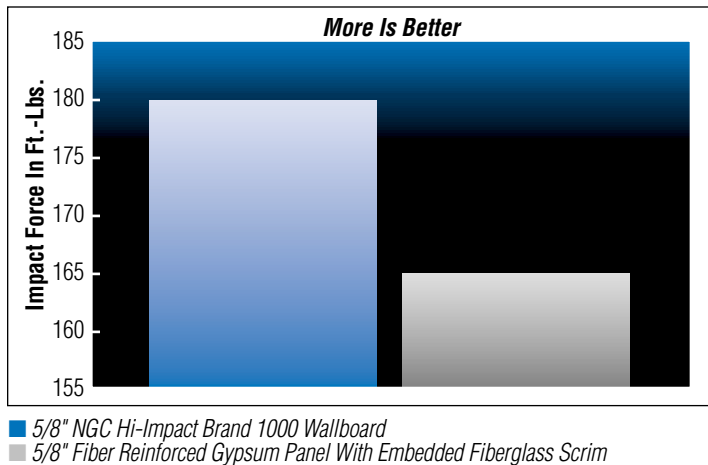


SMALL PROJECTILE IMPACT TEST

	Impact Force In Ft.-Lbs.
5/8" NGC Hi-Impact Brand 1000 Wallboard	180
5/8" Fiber Reinforced Gypsum Panel With Embedded Fiberglass Scrim	165

Procedure Summary - A 2'x2' test wall is securely clamped to a rigid test frame and impacted with a ram mounted on a pendulum which is faced with a nominal 2-1/2" pipe cap. The **maximum** impact force that the sample can withstand without penetration through the face of the sample is reported in foot-pounds.

This test measures the ability to withstand the impact of a small, hard object such as a hammer or heel of a boot.



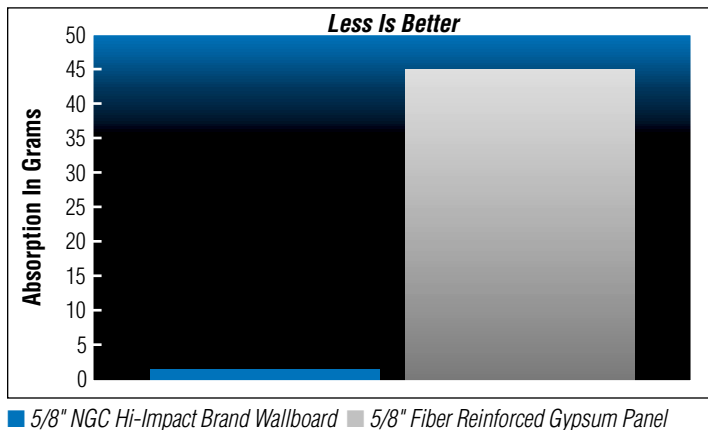
MOISTURE ABSORPTION

Modified ASTM D 3285

	Absorption In Grams
5/8" NGC Hi-Impact Brand Wallboard	1.37
5/8" Fiber Reinforced Gypsum Panel	45.04

Procedure Summary - To measure water absorption, a Cobb Ring was clamped to the panel surface, filled with a 1" head of 70° F water for 1 hour and the moisture absorption was calculated by weight difference.

This test measures surface absorption which effects the ability to withstand moisture on jobsite conditions and provides an indication of the amount of paint required to finish the surface to an acceptable level.



IMPACT / PENETRATION RESISTANCE RATING

Per ASTM D 2394 Modified*

Product	Impact/Penetration Resistance (Ft.-Lbs.)
5/8" Fire-Shield Type X Hi-Impact Brand 1000 (Substrate – (0.010" Lexan)*)	264
5/8" Fire-Shield Type X Hi-Impact Brand 2000 (Substrate – (0.020" Lexan)*)	846
5/8" Fire-Shield Type X Hi-Impact Brand 3000 (Substrate – (0.030" Lexan)*)	1450
5/8" Fire-Shield Type X Hi-Impact Brand 8000 (Substrate – (0.080" Lexan)*)	>2188
1/2" Fiber-Reinforced Gypsum Panel (single layer)	24
5/8" Fiber-Reinforced Gypsum Panel (single layer)	24
5/8" Fiber-Reinforced Gypsum Panel (double layer)	168
5/8" Fiber-Reinforced Gypsum Panel With Fiberglass Scrim	144
5/8" Fiber-Cement/Gypsum Composite Panel	24
1/2" Regular Wallboard (single layer)	36
5/8" Type X Wallboard (single layer)	60
5/8" Type X Wallboard (double layer)	72
1/2" Exterior Grade Plywood	216
7/16" OSB With 1/2" Regular Wallboard	144
8" CMU Unreinforced – Single Block (at hollow)	12
8" Unreinforced Single Block (at rib)	72

*Testing certified by ITS/Warnock Hersey Laboratories.

Footnotes:1.

Impact rating indicates the maximum force in foot-pounds resisted in a single drop without penetration into the wall.

- When impacted by a 5-1/2" diameter, hemispherical projectile, 5/8" Fire-Shield type X Hi-Impact Brand Wallboard applied vertically to 20 gauge 3-5/8" studs spaced 16" o.c. with 1-1/4" long, type S screws spaced 8" o.c. along edges and 12" o.c. in the field of the board will resist an impact force of 264 foot-pounds (Hi-Impact Brand 1000), 846 foot-pounds (Hi-Impact Brand 2000), 1450 foot-pounds (Hi-Impact Brand 3000), and > 2188 foot-pounds (Hi-Impact Brand 8000) without penetration.
- With the exception of the concrete block, all products were tested on metal framing consisting of 3-5/8", 20 gauge studs and track. Products were attached with 1-1/4" type S screws 8" o.c. along the perimeter and 12" o.c. in the field.

combustible" as stated in section 215 of the 1997 Uniform Building Code, section 202 of the 1999 Standard Building Code, and are accepted as non-combustible in accordance with section 704.4.1.2 of the 1999 BOCA National Building Code.

In addition, Hi-Impact Brand Fire-Shield Wallboard and Hi-Impact Brand Kal-Kore Plaster Base meet the definition of "Limited-Combustible" as stated in section 3.3.118 of NFPA 101 Life Safety Code, 2000 edition, and chapter 2 of NFPA 220 Types of Building Construction, 1999 edition.

POTENTIAL HEAT VALUE

Potential Heat Values per NFPA 259 are as follows:

Hi-Impact Brand 1000 - 488 BTU/lb.

Hi-Impact Brand 2000 - 771 BTU/lb.

Hi-Impact Brand 3000 - 1086 BTU/lb.

WATER VAPOR PERMEABILITY

In tests conducted according to ASTM test method E 96 (desiccant method), Hi-Impact Brand Fire-Shield Wallboard showed a performance of less than 0.3 perm.

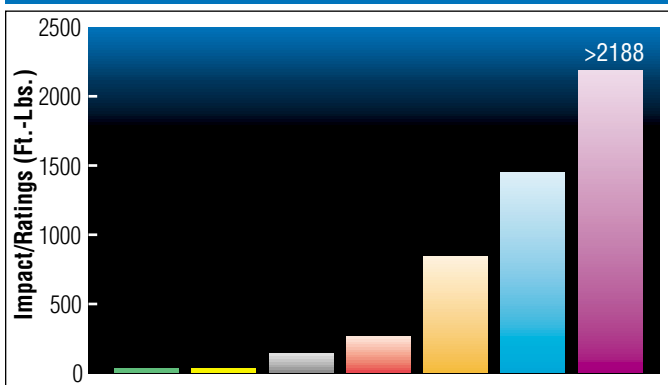
FIRE ENDURANCE

1 Hour Rating: 5/8" Hi-Impact Brand Fire-Shield type X Wallboard screw attached vertically to both sides of 20 gauge 3-5/8" studs spaced 16" o.c. with 1-1/4" long, type S screws spaced 8" o.c. along edges and 12" o.c. in the field of the board. Wallboard joints staggered.

WHI Test No: 651-0489.01
UL U495, V416

2 Hour Rating: Constructed with a base layer of 5/8" Hi-Impact Brand Wallboard with an additional layer of 5/8" Fire-Shield type X wallboard screw attached vertically to both sides of 20 gauge 3-5/8" studs spaced 16" o.c. with joints staggered between face and base layer. Base layer attached with 1-1/4" long

IMPACT / PENETRATION RESISTANCE RATING



Products

- 5/8" Fiber-Cement/Gypsum Composite Panel
- 5/8" Fiber-Reinforced Gypsum Panel (single layer)
- 5/8" Fiber-Reinforced Gypsum Panel With Fiberglass Scrim
- 5/8" Fire-Shield Type X Hi-Impact Brand 1000 (Substrate – (0.010" Lexan)
- 5/8" Fire-Shield Type X Hi-Impact Brand 2000 (Substrate – (0.020" Lexan)
- 5/8" Fire-Shield Type X Hi-Impact Brand 3000 (Substrate – (0.030" Lexan)
- 5/8" Fire-Shield Type X Hi-Impact Brand 8000 (Substrate – (0.080" Lexan)

TECHNICAL DATA

Sizes & Types

- Width: 4' (1219mm)
- Lengths: 8' (2438mm) through 12' (3658mm)
- Thickness: 5/8" (15.9mm)
- Edge: Tapered

Surface Burning Characteristics

- ASTM E 84
- Flame spread (Face): 15
- Flame spread (Back): 50 or less

NONCOMBUSTIBLE

Hi-Impact Brand Fire-Shield Wallboard and Hi-Impact Brand Kal-Kore Plaster Base meet the definition of "non-

type S screws spaced 8" o.c. along edges and 12" o.c. in the field of the board. Outer layer attached with 1-5/8" long type S screws spaced 16" o.c. in the field and along vertical edges and 12" o.c. to the floor and ceiling runners.

UL U495

ACCESSORIES

Hi-Impact Brand Wallboard

- Fasteners: drywall screws
- Joint tape
- Joint compound
- Cornerbead
- Trims
- Casing beads
- Furring channels
- E-Z Strip control joints
- .093 zinc control joint

Hi-Impact Brand Kal-Kore Plaster Base

- Kal-Mesh to reinforce joints and interior angles
- Kal-Korner Bead
- Expanded Veneer Cornerbead
- Veneer L Trim Casing Bead
- Veneer J Trim Casing Bead
- E-Z Strip Control Joint
- Fasteners: Type S Screws - 1-1/4" for single layer and 1-5/8" for outer layer in two-ply application to 3-5/8", 20 gauge screw studs.

STRUCTURAL CORNER SYSTEM

No-Coat Drywall Corner System

- No-Coat® has engineered a corner system that actually becomes part of the structure. The center membrane of each No-Coat Structural Drywall Corner is made of strong, impact-resistant plastic. On the inner surface, joint tape permanently bonds the entire flange to the drywall corner with just a small amount of ProForm® All Purpose joint compound.

- NAHB research Center tests determined that No-coat Structural Corners are eight times stronger than traditional cornerbead.

- When used in combination with Hi-Impact Wallboard, No-Coat UltraCorner™ Structural Corner provides a superior system that is more resistant to impact and surface abuse than conventional drywall systems.

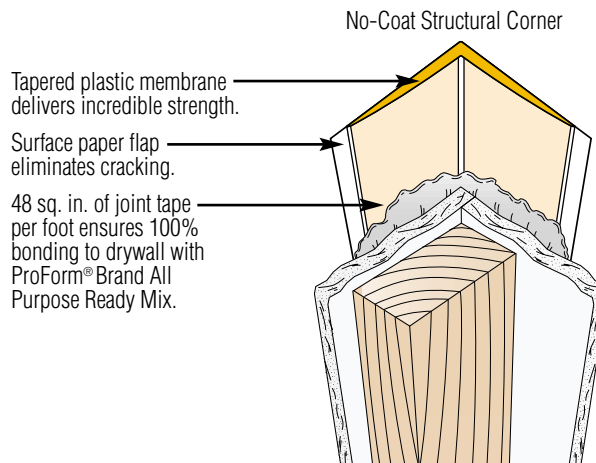
- For more information, contact No-Coat at www.no-coat.com.

NAHB RESULTS FROM IMPACT TESTING

Corner Product	Height Of Level 1 Failure
Vinyl Standard	12"
Vinyl Radius	12"
Metal Crimp-On	12"
Metal Radius	12"
Paper-Face Metal	18"
Metal Nail-On	24"
No-Coat UltraCorner™	96"

The chart above indicates at what drop height each corner type warranted repair. The No-Coat UltraCorner displayed significantly greater resistance to hard-bodied impact than the other corners tested.

Procedure Summary - A steel cylinder, two inches in diameter with a rounded head and weighing about two pounds, was used as the impact object. The cylinder was dropped down a guide tube at various heights, beginning at six inches, to gauge the degree of impact each corner type could sustain.



INSTALLATION

Hi-Impact Brand Wallboard

- Installation of 5/8" Hi-Impact Brand Fire-Shield type X Wallboard should be consistent with methods described in Applicable Standards (see page 15) with one exception - for best results, cutting and scoring of Hi-Impact Brand 1000, 2000 and 3000 should be from the back side of the board. (Hi-Impact Brand 8000 should be cut with a circular saw (face up) using a carbide-tipped fine-toothed blade. For cutting out minor penetrations, use a carbide-tipped router.)

- For best painting results, all surfaces, including joint compound, should be clean, dust-free and not glossy. To improve fastener and joint concealment, a coat of a quality drywall primer is recommended to equalize the porosities between surface paper and joint compound. The selection of a paint to give the specified or desired finished characteristics is the responsibility of the architect or contractor. Hi-Impact Brand wallboard that is to have a wall covering applied to it should be prepared and primed as described for painting.

- Gypsum Association GA-214, Recommended Specification for Levels of Gypsum Board Finish, should be referred to in order to determine the level of finishing needed to assure a surface properly prepared to accept the desired decoration.

Hi-Impact Brand Kal-Kore Plaster Base

- Hi-Impact Brand Kal-Kore Plaster Base is installed in the same manner as Hi-Impact Brand Wallboard noted above.

■ Plaster base job site conditions of temperature and humidity, mineral content of water and variances in aggregates often cause shading discolorations in the plaster. Therefore, the veneer plaster should not be considered a finished product. Plaster should be painted or decorated in some other manner. Paint manufacturers should be consulted as to compatible products. National Gypsum recommends alkali-resistant primers formulated for use over new plaster. High build, heavy duty and special purpose coatings such as Epoxy are not recommended over veneer or job gauged lime putty finishes.

APPLICABLE STANDARDS

Hi-Impact Brand Wallboard

ASTM C 840

Gypsum Association GA-216

Gypsum Association GA-214

National Gypsum Co.
Gypsum Construction Guide

Hi-Impact Kal-Kore Brand Plaster Base

ASTM C 843

ASTM C 844

National Gypsum Co.
Gypsum Construction Guide

SPECIFICATIONS

The following paragraphs are for insertion into sections of generic specifications or generic/proprietary specifications covering gypsum wallboard products. The National Gypsum product name follows the generic description in parentheses.

PART 2 PRODUCTS

A. Fire and Impact/Penetration Resistant Gypsum Board: A gypsum core wall panel with additives to enhance fire resistance, surface indentation resistance, and



The Pepsi Center, home of the NBA Denver Nuggets and the NHL Colorado Avalanche, used Hi-Impact Brand Wallboard throughout its high-traffic areas.

impact resistance of the core and surfaced with abrasion-resistant paper on front and long edges, heavy liner paper bonded to the back side, and a GE Lexan Substrate adhered to enhance impact/penetration resistance and complying with ASTM C 36/C 1396 type X Hi-Impact Brand Gypsum Wallboard.

1. Thickness: 5/8 in. with 0.010" Lexan substrate (Hi-Impact Brand Fire-Shield type X 1000);

5/8 in. with 0.020" Lexan substrate (Hi-Impact Brand Fire-Shield type X 2000);

5/8 in. with 0.030" Lexan substrate (Hi-Impact Brand Fire-Shield type X 3000);

5/8 in. with 0.080" Lexan substrate (Hi-Impact Brand Fire-Shield type X 8000*).

2. Width: 4 ft.

3. Length: 8 ft. through 12 ft.

4. Edges: square, tapered, or Beveled Tapered (Smooth Edge)

5. Impact Resistance: No failures after 100 impacts when tested in accordance with ASTM E 695, modified.

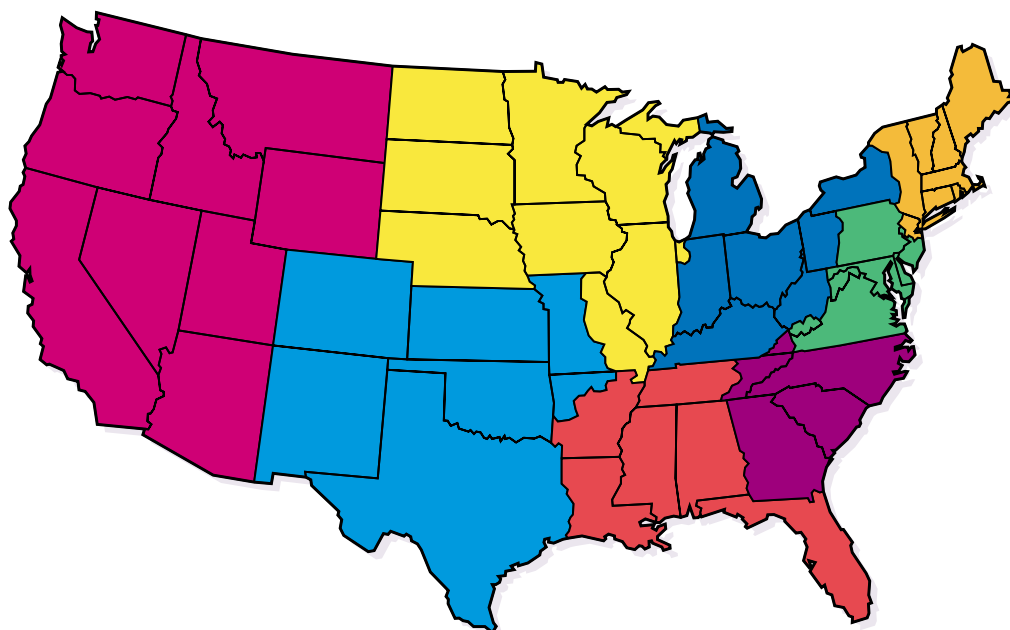
6. Indentation Resistance: Not less than 469 lbs. to produce 0.200 in. depth of the surface indentation when produced in accordance with ASTM D 1037, modified.

7. 3M Surface Abrasion Resistance: Not greater than 0.001 in. when tested at 250 cycles in accordance with ASTM D 4977, modified.

8. Taber Surface Abrasion Resistance: Not greater than 0.010 in. when tested at 125 cycles in accordance with ASTM D 4060, modified.

9. Penetration Resistance: 264 ft.-lbs. without penetration (Hi-Impact Brand Fire-Shield type X 1000); 846 ft.-lbs. without penetration (Hi-Impact Brand Fire-Shield type X 2000); 1,450 ft.-lbs. without penetration (Hi-Impact Brand Fire-Shield type X 3000); >2188 ft.-lbs. without penetration (Hi-Impact Brand Fire-Shield type X 8000).

*Hi-Impact Brand 8000 is manufactured with heavy natural-finish paper on the face side.



CUSTOMER SERVICE SALES AREAS

■ Western Area

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Fax: (800) 438-6266

■ Midwest Area

Phone: (800) 323-1447
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■ Southwest Area

Phone: (800) 548-9396
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■ Southeast Area

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National Accounts

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Manufactured Housing

Phone: (800) 455-3185
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