

***Hi-Impact 8000 brand Fire-shield
Gypsum Wallboard
5/8" Tapered Edge Type X Core***

***Test #1
Wall Breach***

Purpose:

To determine the effectiveness of basic firefighting hand tools when attempting to breach a wall constructed with Hi-Impact 8000 brand Fire-Shield Gypsum Wallboard.

Materials used:

1 – 4' x 8' sheet of National Gypsum Hi-Impact 8000 brand Fire-shield Gypsum Wallboard
Drywall screws
Firefighter rescue simulator (framed wall with 16" center studs)
8lb. Maul
8lb. Pick-head axe
8lb. Flat-head axe
12lb. Sledgehammer
Halligan bar

Test Material:

The test was conducted by utilizing 5 different hand tools that a firefighter will most likely have with him during firefighting operations. Each of the 5 different hand tools was used to attempt to breach the Hi-Impact 8000 Wallboard. The wall was constructed of wooden studs on 16" centers. The 4' x 8' sheet of wallboard was mounted to the studs using ordinary drywall screws. The wall is pictured below:



Test Process:

Numerous basic hand tools were used to attempt to breach the Hi-Impact 8000 Wallboard. The tools used for this test are as follows: 8lb. Splitting maul (both sides), 12lb. Sledgehammer, 8lb. Pick-head axe (blade), Halligan bar (adz end), 8lb. Flat-head axe (striking end). The concept of the test was to determine if an opening large enough, to accommodate an escaping firefighter, could be created and to determine which tools worked best to breach the wallboard. The firefighter was positioned on his knees, to stay low, to simulate being in a fire condition.

Test Results & Findings:

Below is a list of the basic firefighting hand tools used in the test, how many times the wallboard was struck by the firefighter, and if the wallboard was breached.

<u>Tool</u>	<u>Times struck</u>	<u>Results</u>
8lb. Maul (striking end)	14	Did not breach wallboard
12lb. Sledgehammer	14	Did not breach wallboard
8lb. Pick-head axe (Blade)	38	Broken wall stud Penetrated wall on 6 th swing Created hole large enough for firefighter
Halligan bar	30	Penetrated wall on 4 th swing Created hole large enough for firefighter
8lb. Flat-head axe (striking end)	18	Did not breach wallboard
8lb. Maul (cutting end)	19	Penetrated wall and broke a wall stud

As shown in the table above, all of the striking tools were proven ineffective in breaching the Hi-Impact 8000 Wallboard. The cutting tools proved to be most effective, usually penetrating the Lexan in less than 10 swings. The Lexan did not break easily after being struck but it did crack enough to become pliable enough to bend while the firefighter crawled through the hole. One thing to consider while you are crawling through the wall, is the Lexan had tendency to get caught up on personal protective equipment and will possibly cut or rip the PPE with the sharp edges. Another consideration, is the amount of time it took to create a hole large enough to accommodate a firefighter's size. If fire conditions are deteriorating, the firefighter is already at increased risk. Also, this test was performed with the Hi-Impact 8000 Wallboard on only 1 side of the stud. Chances are, if this product is encountered, it will be mounted to both sides of the studs, therefore at least doubling the amount of time and effort to breach the wall in an emergency situation.

Conclusion:

In conclusion, it was demonstrated that breaching the Hi-Impact 8000 Wallboard has a high resistance to impact forces brought on by striking tools. The tool of choice when this product is encountered is a cutting tool. This test further stresses the fact that departments need to get out in their response areas (even auto or mutual aid areas) and know what kind of building materials are being used.

Additional Photos:



Test Performed by:

Firefighter/Paramedic Sean Murphy – Roberts Park Fire Protection District
Firefighter/Paramedic Matthew Duzak – Roberts Park Fire Protection District

Photos Taken by:

Assistant Chief Ed Murphy – Roberts Park Fire Protection District
Firefighter/Paramedic Don Huenecke – Roberts Park Fire Protection District

Report Prepared by:

Firefighter/Paramedic Sean Murphy – Roberts Park Fire Protection District