Field Testing of Windows and Doors

1.0 Introduction - Field testing of installed windows and doors has increased dramatically in the last several years. Therefore, verifying the field testing parameters and witnessing field tests has become very important to Graham Architectural Products (GAP). All GAP contracts have a section that deals with Field Testing. That section covers several Field Testing topics, however they all tie back to one document. *AAMA 502 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products"*. There are several reasons that Graham Architectural Products requires all field testing to be performed in accordance with this document:

1.2 Consensus Document – AAMA 502 has been created by the American Architectural Manufacturers Association (AAMA), which is an industry association. People from various aspects of the industry (manufacturers, architects, test labs, etc.) are involved in the association, and have say on the content of the document. AAMA 502 references other standards, such as ASTM E783 and E1105, which are test methods that describe how to perform the air infiltration and water penetration tests.

1.3 Manufacturer and Specifier Agreement – AAMA 502 gives the specifier (i.e. architect, consultant, general contractor, etc.) the flexibility to choose the performance level that they require for their building. However, in many cases, the required performance level is not based on scientific logic, but an arbitrary basis. The design pressure that should be used on any building can be determined by using ASCE-7. In order to prevent unrealistic expectations to be placed on our products, we require that any field performance requirements are approved in writing by our Engineering or our Technical Services Department prior to bidding of the project.

1.4 Field Reductions – AAMA 502 allows for reductions in the field performance when compared to the AAMA laboratory testing requirements. The air infiltration rate is allowed to be increased 1.5 times the AAMA laboratory requirements, and the water performance is reduced to 2/3rds of the laboratory test pressure for the applicable performance grade. These reductions are used to account for several issues. In the field, there are industry accepted tolerances for the installation. These slight differences can make a difference in the performance when compared against the laboratory results. Environmental conditions in the field can affect the results of the field testing. In most cases, the unit being tested in the field is not the same size or configuration as the laboratory sample. A difference in the size of the specimen can greatly affect the air infiltration result (which is discussed in AAMA 502). In addition, the accuracy of field testing equipment is not to the same level as laboratory equipment. Therefore, Graham requires the reductions are followed, unless approved by our Engineering or our Technical Services Department prior to any field testing. Below are the allowables that we will agree to.

AIR INFILTRATION (AW rated windows)		
Product Type (All rates are at 6.24 PSF)	**AAMA/WDMA/CSA 101/I.S.2/A440**	**AAMA 502 (Field Test)**
All Fixed and Projected (and Casement) Windows and Doors	0.10 cfm/ sq. ft.	0.15 cfm/ sq. ft.
All Hung Windows, and Horizontal Sliding Windows and Doors	0.30 cfm/ sq. ft.	0.45 cfm/ sq. ft.
WATER RESISTANCE TEST PRESSURE (AW rated windows)		
Performance Grade 40 (Design Pressure 40 PSF)	8.00 PSF	5.33 PSF
Performance Grade 45 (Design Pressure 45 PSF)	9.00 PSF	6.00 PSF
Performance Grade 50 (Design Pressure 50 PSF)	10.00 PSF	6.67 PSF
Performance Grade 55 (Design Pressure 55 PSF)	11.00 PSF	7.33 PSF
Performance Grade 60 or higher (Design Pressure ≥ 60 PSF)	12.00 PSF	8.00 PSF

1.5 Accredited Laboratory – There are many companies that are claiming to be capable of performing field testing. AAMA has spent years developing a field laboratory certification program. AAMA 502 and our contract requires the test lab to be accredited to perform field testing. Therefore, Graham Architectural will accept AAMA accredited laboratories, and other accreditations will have to be reviewed.

1.6 Manufacturer Witnessing of Tests – AAMA 502 requires that the window manufacturer is notified of any testing on their products with a **minimum** of one weeks' notice prior to the test date. Graham requests as much lead time as possible considering travel requirements. The AAMA 502 specification also stipulates the windows or doors are inspected for functionality prior to testing. Therefore, Graham requires appropriate notification of testing, and the opportunity to attend the testing. That way, our personnel can make sure that the window or door was not damaged during shipment or installed improperly, as well as verify the test laboratories credentials and testing methods. Graham reserves the right to not accept the results of any field tests where these requirements have not been met. In addition, we will not be responsible for any remedial work or retest costs if we were not allowed to witness the tests.

2.0 Field Test Procedures:

AAMA 502 "Voluntary Specification for Field Testing of Newly Installed Fenestration Products".

ASTM E783 "Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors". ***Note:*** *This is a procedure used in AAMA 502*

ASTM E1105 "Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference." ***Note:*** *This is a procedure used in AAMA 502*

2.1 NOT Approved Field Test Procedures – *Unless specifically approved by GAP Technical Services. These are not tests that we have performed on our products in the past, therefore we cannot predict the results.*

AAMA 501.1 "Standard Test Method for Water Penetration of Windows, Curtain and Doors Using Dynamic Pressure." ***Note:*** *This is typically called the "Dynamic Water Test", which uses a motor driven propeller to create wind-driven rain.*

AAMA 501.2 "Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems." ***Note:*** *This is typically called a "Hose" or "Nozzle" test. It is not intended for windows or doors, and specifically not for operable products.*

AAMA 503 "Voluntary Specification for Field Testing for Field Testing of Newly Installed Storefronts, Curtain Walls, and Sloped Glazing Systems." ***Note:*** *This is not for windows or doors.*

AAMA 520 "Voluntary Specification for Rating the Severe Wind-Driven Rain Resistance of Windows, Doors, and Unit Skylights. ***Note:*** *This is a laboratory test procedure for high velocity wind-driven rain conditions with no correlation to wind zones and exposure categories.*