AAMA sometimes receives inquiries as to what are the “best” windows to use. I was told by a former co-worker before I joined AAMA that the “best” window is the one that your spouse likes. In reality, the answer is a bit more involved.

Aside from the combinations of window operating types, size, appearance, brand name, operating features, shape or color, there’s also cost. But the basic attributes that lead to the “best” window are based on measurable performance in terms of structural strength, resistance to water leakage and “tightness” against air infiltration, plus energy efficiency. The needed level of performance is dictated by the design, location and function of the specific building in which they are to be used—not by the type of framing material.

NAFS Has the Answers

The key to finding the best window lies in understanding the conditions at the installation site in the context of the material-neutral, performance-based North American Fenestration Standard (NAFS). NAFS provides a uniform basis by which all materials and products can be tested and compared on a level playing field, a process that automatically takes into account the strengths and weaknesses of all framing materials.

Under NAFS, the maximum wind velocity likely to be experienced at the building site (modified appropriately for building design, height and function) defines the force (design pressure) that the windows must withstand without being structurally compromised. From this, the Performance Class and Performance Grade are determined for windows that will meet the defined in-service challenges. That Design Pressure also defines the degree of resistance to water leakage and air infiltration that the window must exhibit. NAFS guides the evaluation of 45 fabricated product types.

Most windows used in low-rise residential applications fall into Performance Class “R,” with a design pressure that may vary above the class threshold of 15 psf to any higher rating dictated by local wind conditions (e.g., in hurricane zones).

In addition to these basics, NAFS also takes into account that a window is a complex, interacting system of components that must perform properly over a long service life. Qualified components are recognized by being published in the AAMA Verified Components List.

Note that windows made with polymeric frame and sash profiles, such as vinyl, fiberglass, ABS and cellulose composites, must demonstrate independent certification with specifications for those materials. The requirements include such properties as impact resistance, dimensional stability, heat resistance, weight tolerance, lead content and color retention as determined from years of actual outdoor weathering tests.

Go for the Gold

To ensure that a window meets NAFS, look for the gold AAMA certification label on an inside surface of the frame. This shows that the product has been independently laboratory tested for as-designed performance, backed by separate component checks and frequent in-plant quality-control assessments. Tabs can be added to the basic label to indicate windows designed for energy performance, forced entry and impact resistance, among other factors.

The best windows in terms of energy efficiency are those rated by the NFRC for U-factor and solar heat gain coefficient corresponding to the values set by the Energy Star program for different regions of the country.

Note that as a building element, windows may have to serve other purposes besides structural adequacy or energy efficiency. They may provide means of emergency egress in the event of fire, defense against forced entry, protection from impact of windborne debris in hurricane zones, “green” credentials (e.g., recycled or renewable content and/or recyclability), acoustic isolation properties (a consideration for buildings in noisy urban locations) and child fall prevention devices in multi-story applications. There are, of course, trade-offs in accounting for all of these.

It is the buyer’s task to first determine the cost-benefit trade-off among performance parameters and levels that is acceptable for the job at hand. Then look for evidence of conformance with NAFS at that performance level and for Energy Star credentials. Any window of any framing material that meets these criteria is qualified to be the best for that application. From there, the choice breaks down to subjective preference of the individual.

And don’t overlook installation. Mistakes or short cuts here can defeat the features of even the “best” windows.

Richard Rinka is the technical manager for standards and industry affairs for the American Architectural Manufacturers Association in Schaumburg, Ill.