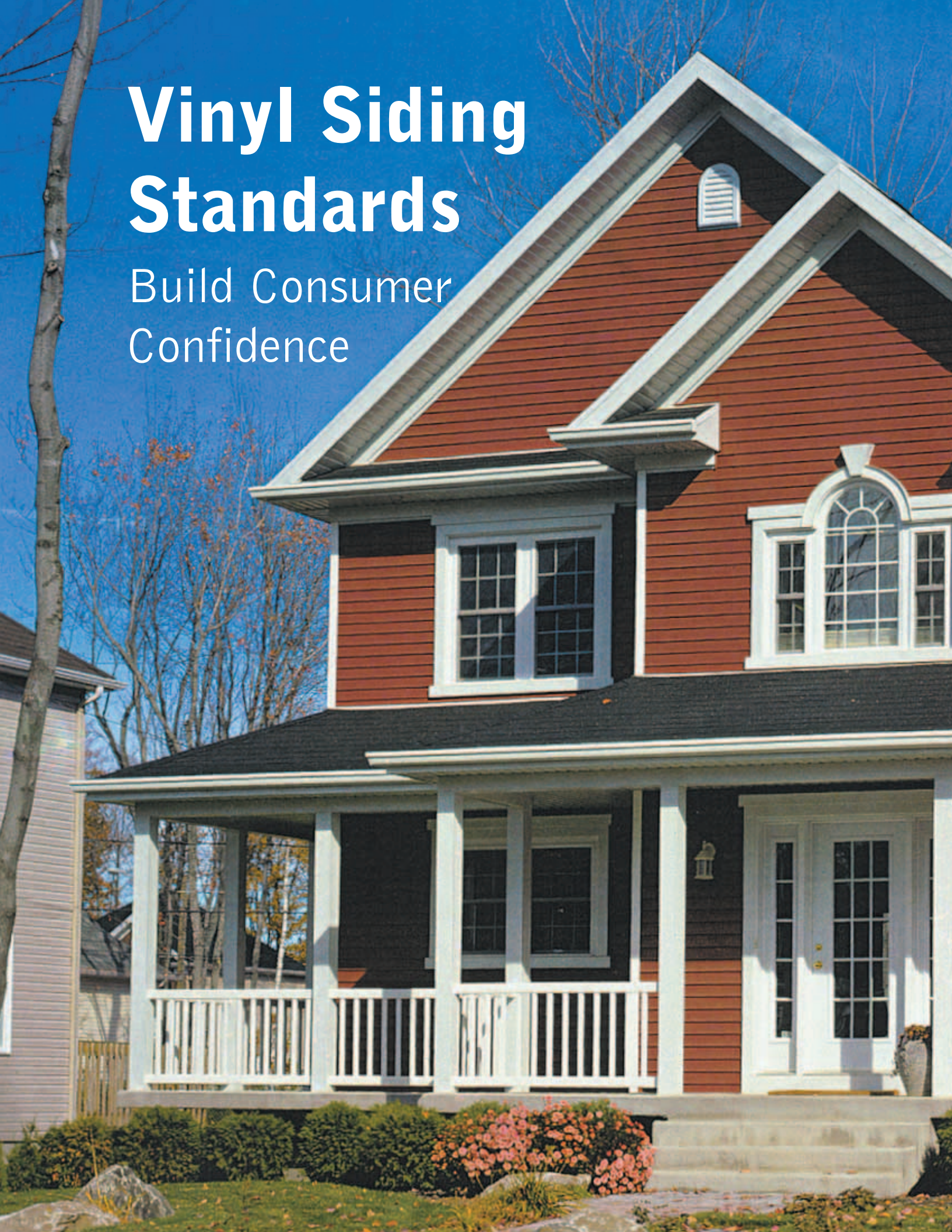


Vinyl Siding Standards

Build Consumer
Confidence



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BY DAVID S. JOHNSTON

THROUGH ACTIVE IMPLEMENTATION

and verification of adherence to ASTM standards, the Vinyl Siding Institute has developed a three-pronged approach to enhancing consumer satisfaction with its products.

Vinyl siding has long been the most popular exterior cladding choice for North American homes¹ because of its versatility, attractiveness, low-maintenance durability, and value. The performance and consistency of North American vinyl siding has been enhanced by an array of ASTM standards under the jurisdiction of Committee D20 on Plastics, Subcommittee D20.24 on Plastic Building Products.

ESSENTIAL PRODUCT QUALITY AND PERFORMANCE

The flagship ASTM International standards for vinyl siding are D 3679, Specification for Rigid Poly(Vinyl Chloride) (PVC) Siding, and D 4477, Specification for Rigid (Unplasticized) Poly(Vinyl Chloride) (PVC) Soffit. These two documents reference, in turn, a number of other standards for specific properties or performance criteria. Some of those standards are shown in Table 1.

The Vinyl Siding Institute uses those standards as the benchmarks for its VSI Vinyl Siding Product Certification Program, which uses an accredited third-party testing and quality assurance agency, or administrator, conducting unannounced periodic inspections to verify that siding products meet or exceed the requirements of those standards. Consumers can confirm that a siding product is certified through

VSI's program by checking package labeling, brochures and Web site listings. The extensive use of ASTM standards by VSI's product certification program was discussed in an earlier article in *SN*.²

Model building codes, such as those published by the International Code Council, have long required that vinyl siding meet the requirements of ASTM D 3679. But until recently the requirement lacked enforceability — the code did not require documentation of initial or ongoing compliance. Now, starting with the 2006 editions, the International Building Code and Interna-

tional Residential Code both require that compliance with D 3679 be certified through a third-party quality control agency. Code officials will be able to confirm such certification through package labeling that can only be applied if compliance with the ASTM standard has been verified through an independent agency. This new requirement provides a key link in the chain from development of an ASTM product performance standard to consumer satisfaction with the products manufactured under that standard.

ASSURING PROPER INSTALLATION

As with most building systems, the performance of a finished product is only as good as its installation, and ASTM standards also address that essential element. ASTM D 4756, Practice for Installation of Rigid Poly(Vinyl Chloride) (PVC) Siding and Soffit, provides compre-



Table 1: Selected ASTM Standards Referenced by ASTM D 3679 and D 4477

D 618	Practice for Conditioning Plastics for Testing
D 635	Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
D 696	Test Method for Coefficient of Linear Expansion of Linear Thermal Expansion of Plastics Between -30°C and 30°C with a Vitreous Silica Dilatometer
D 1042	Test Method for Linear Dimensional Changes of Plastics Under Accelerated Service Conditions
D 1435	Practice for Outdoor Weathering of Plastics
D 2244	Practice for Calculation of Color Tolerance and Color Differences from Instrumentally Measured Color Coordinates
D 2457	Test Method for Specular Gloss of Plastic Films and Solid Plastics
D 4226	Test Methods for Impact Resistance of Rigid Poly(Vinyl Chloride) (PVC) Building Products
D 4477	Specification for Rigid (Unplasticized) Poly(Vinyl Chloride) (PVC) Soffit
D 4756	Practice for the Installation of Rigid Poly(Vinyl Chloride) (PVC) Siding and Soffit
D 5206	Test Method for the Windload Resistance of Rigid Poly(Vinyl Chloride) (PVC) Siding

hensive and detailed requirements for the proper installation of siding for a variety of building types and cladding configurations. In conjunction with the manufacturer's installation instructions, this standard helps ensure that installed vinyl siding will look attractive, be properly secured to the building, allow for expansion and contraction over the expected temperature range, and properly manage moisture over the wall surface and building penetrations, among other critical performance criteria.

The manufacturer's installation instructions are coordinated with D 4756 through a reference in ASTM D 3679. Certain installation details set forth in the instructions are verified through testing under D 3679. For instance, the type, size, penetration depth and minimum spacing of fasteners to be specified in the instructions are used during windload testing under D 3679 and its referenced standard, D 5206, Test Method for Windload Resistance of Rigid Poly(Vinyl Chloride) (PVC) Siding. Code officials can be assured that if the fastening requirements expressed in the instructions are followed, the installed siding will comply with the

minimum windload resistance standards in effect for their locality. And consumers can be confident that, if properly installed, the siding will stay on the building during the worst storm likely to occur in their area.

But proper installations require qualified installers, and once again ASTM standards are playing a key role. VSI has established a Certified Installer program based on ASTM D 4756. The program targets all levels affecting the installation process, examining the ability of installation companies to maintain adequate quality control procedures, the ability of trainers to effectively convey accurate information, and the field installer's knowledge and understanding of proper installation technique. VSI certified installer candidates are provided a thorough, several-day training program covering the requirements of D 4756 and accepted industry practices, and must pass a final examination based on that standard and other proven installation techniques. VSI-certified companies can use the credential to build consumer confidence in their ability and commitment to high quality installations, VSI-certified installers can proudly show

their identification badges on the job site, and VSI-certified trainers teach the next generation of installers the proper techniques.

ASTM D 3679 and its referenced standards, coupled with product certification and building code enforcement, ensure that vinyl siding will meet exacting product performance standards. ASTM D 4756, coupled with the manufacturer's instructions, building code enforcement, and trained, certified installers, ensures that the siding installation will allow the product to perform properly and avoid consumer dissatisfaction. But until recently, something was missing.

THE NEXT BIG STEP: COLOR RETENTION

What do consumers value most in their vinyl siding? Its ability to maintain its appearance after years of exposure to the elements and, more specifically, its ability to resist objectionable color change over its expected lifetime. While ASTM D 3679 includes basic weatherability requirements, it lacked a rigorous method for verifying that the original color would be retained within reasonable limits. That shortfall has been rectified with the 2003 publication of a new standard, ASTM D 6864, Specification for Color and Appearance Retention of Solid Colored Plastic Siding Products.

Standard D 6864 provides a standardized and consistent method of measuring and evaluating the degree of color change occurring in siding products after a period of outdoor exposure. It includes limits on the acceptable amount of color change based on perceptual studies of color change tolerance for different classifications, or regions, of colors. D 6864 brings a level of sophistication to the difficult subject of color retention not previously available in the vinyl siding industry.

Color retention testing of vinyl siding products is, of course, not new. VSI began sponsoring industry-wide outdoor weathering studies in 1985, in a study that is still ongoing and providing useful data. Approximately every five years

since, VSI has begun a new study, with new samples representing the range of colors and technologies current in the industry at that time. All of those studies remain on exposure and are periodically read and compared with original readings, and the data analyzed, summarized and reported to the industry.

The information from these studies has helped the industry move beyond the relatively limited range of colors offered in early versions of vinyl siding. The traditional whites, beiges and low-chromaticity earth tones, still popular with consumers, have been augmented with a large array of darker, more saturated shades, historic colors, and variegated patterns capable of matching nearly any taste or housing style. Innovative coextrusions of PVC substrate and non-PVC or PVC-alloy capstocks and films have allowed expansion into colors that previously would have been considered vulnerable in some climates.

Subcommittee D20.24 drew upon the data and experience of the vinyl siding industry to build a comprehensive approach to color retention evaluation. Vinyl siding colors have been grouped into 16 different three-dimensional "color region" classifications bounded by the three axes used to describe color space (L , lightness-darkness; a , red-green; b , blue-yellow). Color evaluations were conducted to measure the human perception of acceptable color change within each region. Based on the data collected, three-dimensional ellipsoid equations were developed to mathematically define the area of acceptable color change for each region. The size of the ellipsoid along each axis represents the limit of acceptable color change in that direction.

The L , a , and b values for a weathered sample are read and compared to the original, unweathered readings. The resulting color changes, ΔL , Δa , and Δb are plugged into the ellipsoid equation for that color region to produce an ellipsoid value. An EV of 1.0 or less is on or inside the ellipsoid, and is therefore within the area of acceptable color

change. If the EV is greater than 1.0, the color change is outside the ellipsoid and not acceptable.

With the establishment of a rigorous, consensus-based ASTM standard, VSI felt confident in expanding its VSI Vinyl Siding Product Certification Program into color retention. Certification for color retention is conducted as an enhancement of the existing D 3679 certification. Eligible products must obtain and maintain D 3679 certification; the colors in which that product is offered are separately evaluated and certified for color retention under D 6864. Evidence of compliance with this standard, in the form of data from a two-year outdoor weathering study, successfully completed in three climate zones, must be submitted. Continued compliance of certified colors is verified through a combination of periodic outdoor weathering studies and comparative accelerated weathering.

The first certified colors are scheduled to be announced in April 2006. ASTM D 3679-certified products and colors that are certified for color retention under D 6864 are identified with a special label on packaging and on VSI's Web site, www.vinylsiding.org.

PUTTING IT TOGETHER WITH ASTM STANDARDS

After all its recent standards development activity, Subcommittee D20.24 isn't taking a break. Work continues on refining existing standards to reflect new advancements in the industry. Two new standards — one to cover color retention of variegated (wood-grained) vinyl siding, and a standard specification for polypropylene siding — are currently in the balloting process. A project is also under way to standardize

a test method for laboratory accelerated weathering of vinyl siding.

With the recent completion of this third phase of VSI's ongoing quality assurance effort, consumers can quickly and easily search for and identify vinyl siding products that meet the essential quality and per-



formance requirements of D 3679, and colors that meet the advanced color change resistance requirements of D 6864. By searching VSI's list of certified installers, they can find vinyl siding professionals whose mastery of D 4756 installation requirements has been tested and verified. By utilizing ASTM standards, VSI is providing consumers an unprecedented degree of confidence that their vinyl siding will provide lasting value to their homes. //

References

- 1 Source: U.S. Census Bureau
- 2 "Standard Helps Siding Shed 'Tin Man' Image," *Standardization News*, May 2002, ASTM International.



DAVID S. JOHNSTON is the technical director for the Vinyl Siding Institute, the Washington, D.C.-based association representing manufacturers of vinyl and polymeric siding and their suppliers. Johnston's background includes extensive building code and product standards development work in the heating appliance and natural gas industries. In addition to participating in ASTM Committees D20 on Plastics and E05 on Fire Standards, he has served on technical committees of the National Fire Protection Association and International Code Council.