



CEDAR ROOFING: Proven Weather Resistance

A Claim Adjuster's Guide to Building Codes and Scientific Testing



AN OVERVIEW OF FACTS YOU NEED TO KNOW

The Cedar Shake and Shingle Bureau ("CSSB") was founded in 1915. Its membership includes over 80% of the active manufacturers of cedar shakes and shingles and some 250 distributors, wholesalers, brokers, approved installers, associates, as well as accessory product and service providers. Members manufacture, sell, and install these products to only the highest quality standards. The CSSB only represents member manufacturers who commit to top quality, each and every day.

CSSB manufacturing members are subject to stringent quality control regulations and inspections. The CSSB created and still writes the grading rules for the industry and these rules are incorporated into national building codes as the standard reference guide for commercial and residential projects. In order to ensure top quality products, the CSSB has spent significant time and money developing and managing an effective quality control program. The CSSB's unique quality control program is comprised of two parts: (1) random, unannounced and frequent third party inspections of each manufacturer on the membership roster and (2) the CSSB's own staff Cedar Quality Auditor. The CSSB stands firm on the belief that a stringent quality control program with unannounced inspections is the best way to ensure consistent quality and offer policy holders the products they require for a long lasting, upscale roof.

Building codes encompass a wide range of products and services. They protect the public's safety by listing manufacturing standards for materials used in both residential and commercial structures. They enhance the building industry's knowledge by providing approvals to new, innovative products such as pressure impregnated fire retardant treated cedar shakes and shingles. Building codes provide a reason to hold local, regional, national and international forums to discuss new developments, safety standards, and how to work best with various levels of governments to ensure a wide range of sensible goals are met.

Building codes work and are an important part of our daily lives. It is important to understand why building codes are important, which ones apply to each specific neighborhood, and how more information can be located. After all, in the face of a natural disaster and property losses, the last thing you want to worry about is if a building is code compliant.

Building codes work hand in hand with research and product testing results. Certain tests are required of specific types of products in order for them to be deemed acceptable for structures in various areas of the country. In the roofing industry, products are rated on a number of weather resistant factors. The tests that roofing products undergo are related to:

- Fire resistance
- Wind resistance
- Impact resistance

This brochure is specifically designed to help you, the insurance industry team member, learn how best to work within the building code framework. It also demystifies many of the seemingly complex manuals that tend to accompany code hearings and discussions. Within the following pages you'll find a useful, easy-to-understand guide that leads you through the definition, laboratory process and end results of each roofing product test that is conducted on CSSB member cedar shakes and shingles. Helpful diagrams and bolded text makes this a great reference guide that you can use in discussions with your colleagues, clients, and building officials. A glossary is included at the back, as is a list of frequently asked questions. Best of all, if you need additional assistance, the CSSB team is here to help. Call the fully staffed office or helpful, knowledgeable District Managers who are glad to provide the additional details you seek.

Thank you for your interest.

Important Note: The information in this publication is not intended to supercede local building codes. Check with the local building official for requirements in specific areas.



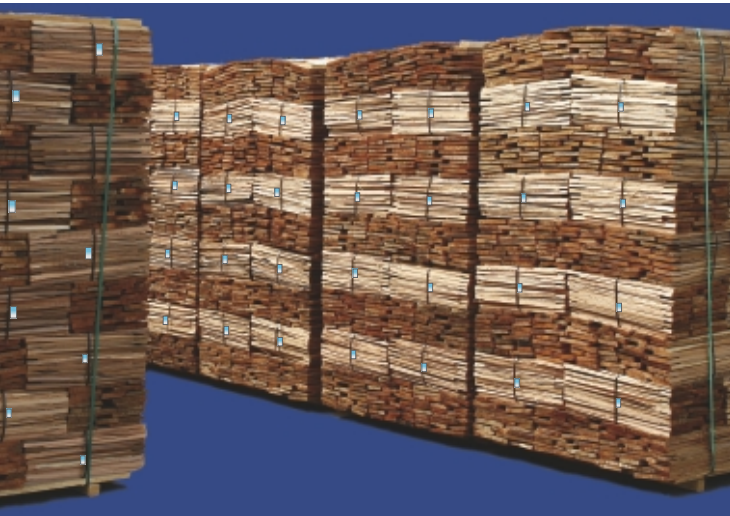
What is really important is how long the structure can ultimately resist fire. For roofs, there are Class A, Class B, Class C and unrated roofing systems. Cedar shake and shingle roofs exist in all these classes. These classes are the same for all roofing materials,

including asphalt, metal and concrete tile. If you live in an area where the risk of fire is high, CSSB member pressure impregnated fire retardant treated cedar shakes and shingles provide an additional value added component to an already satisfying roofing material.

Class A roofing systems are intended for use on highly fire resistant buildings and are required on institutions such as hospitals or jails. Class A roofing systems include cedar roofing products manufactured by CSSB members.

Class B roofing systems are required for use on apartment buildings, condominiums and commercial buildings, and are often recommended for use on dwellings in high fire hazard areas, such as wildland interface urban areas. Class B roofing systems include cedar roofing products manufactured by CSSB members.

Class C roofing systems are the most common ones specified for single family dwellings and duplexes when fire retardant roofing is desired. Class C roofing systems include cedar roofing products manufactured by CSSB members.



Bundles on pallets: each bundle is labeled

Figures 1-3 demonstrate the burning brands made of wood constructed to exacting specifications.

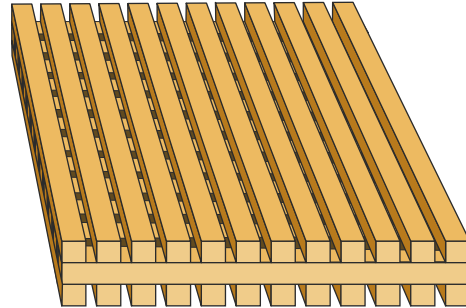


Figure 1.
(Burning) Brand Class A

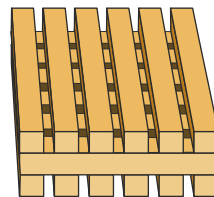


Figure 2.
(Burning) Brand Class B



Figure 3.
(Burning) Brand Class C

(Figures 1, 2 and 3 not shown actual size)

All CSSB member shakes and shingles, which receive CSSB member treater company pressure impregnated fire retardant treatment, are ICBO registered.



Caution: not all cedar products are alike, of the same quality standard, or hold the same test results. CSSB test results are only applicable to CSSB member products. Ask to be sure!

Fire Resistance: Definition and Testing Continued

How is the treatment tested?

CSSB member pressure impregnated fire retardant treated cedar shakes and shingles provide fire protection locked into the roofing material, proven over and over in eight rigorous Underwriters Laboratories (Underwriters Laboratories, Inc. and Underwriters' Laboratories of Canada) designed tests:

1. Intermittent Flame Test without amended rain test
2. Spread of Flame Test without amended rain test
3. Burning Brand Test without amended rain test
4. Flying Brand Test without amended rain test
5. Intermittent Flame Test after amended rain test
6. Burning Brand Test after amended rain test
7. Flying Brand Test after amended rain test
8. Natural Weathering Test (weathering over time outside)

The Intermittent Flame, Burning Brand and Flying Brand Tests are redone after the natural weathering of 1, 2, 3, 5 and 10 years.

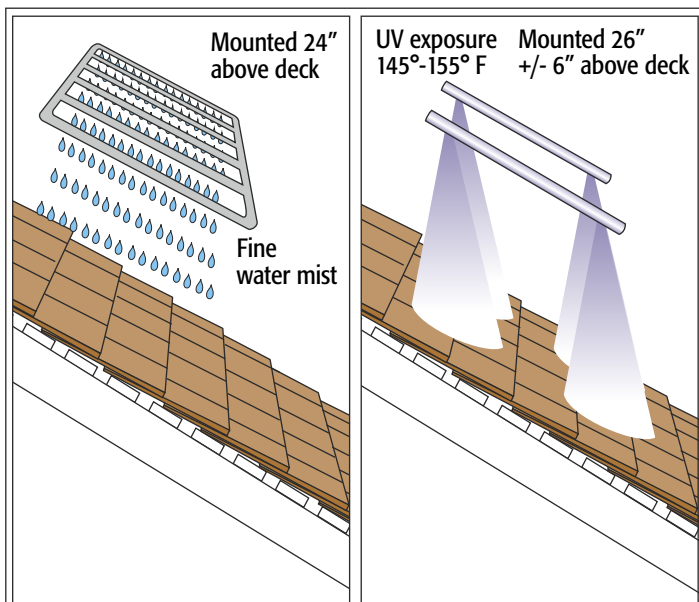


Figure 7. Rain and UV Temperature Test

These test decks are exposed to three conditioning cycles per day for a total of 252, eight-hour cycles. Each cycle consists of water exposure and UV exposure with heat.

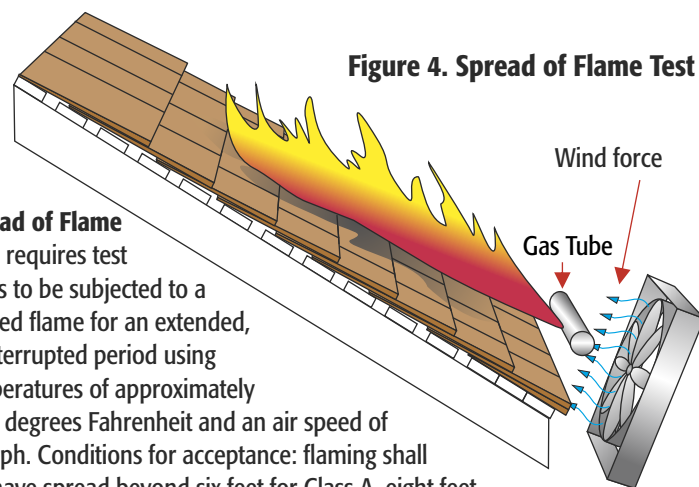


Figure 4. Spread of Flame Test

Spread of Flame

Test: requires test decks to be subjected to a gas-fed flame for an extended, uninterrupted period using temperatures of approximately 1350 degrees Fahrenheit and an air speed of 12 mph. Conditions for acceptance: flaming shall not have spread beyond six feet for Class A, eight feet for Class B and thirteen feet for Class C. There shall have been no significant lateral spread of flame from the path directly exposed to the test flame.

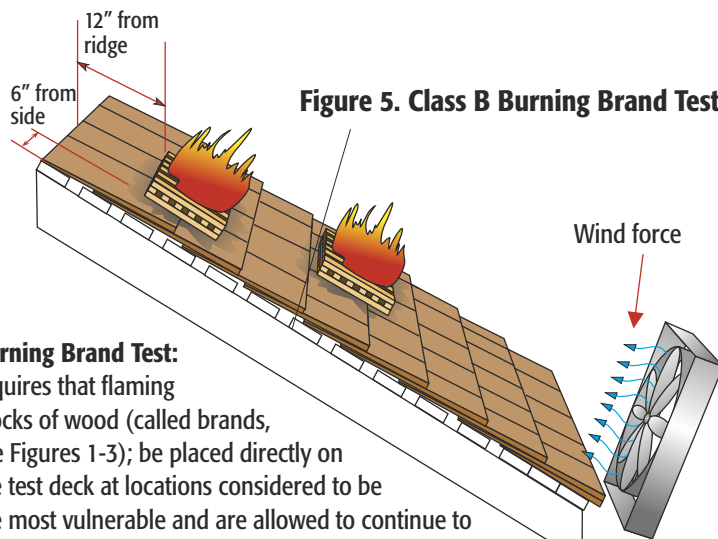


Figure 5. Class B Burning Brand Test

Burning Brand Test:

requires that flaming blocks of wood (called brands, see Figures 1-3); be placed directly on the test deck at locations considered to be the most vulnerable and are allowed to continue to burn until they are completely consumed. Conditions for acceptance: there may be no burn through or sustained flaming on the underside of the deck.

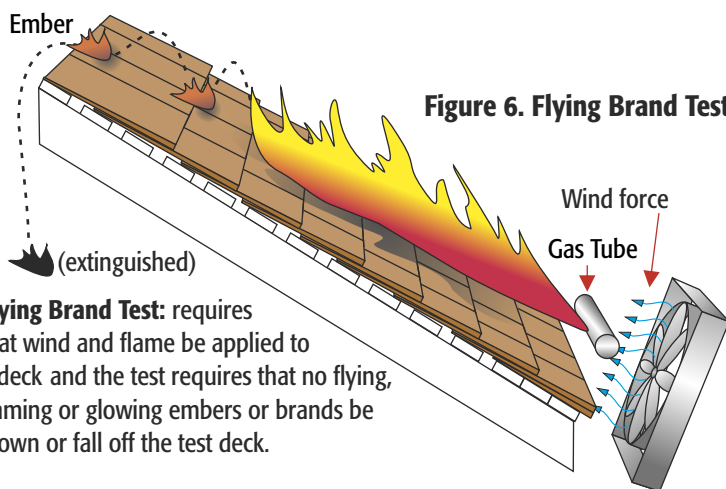


Figure 6. Flying Brand Test

Flying Brand Test: requires that wind and flame be applied to a deck and the test requires that no flying, flaming or glowing embers or brands be blown or fall off the test deck.



Cedar shake and shingle roofs have long been tested, and approved, as being highly wind resistant. As far back as 1952, the CSSB conducted tests at the University of Wichita. At that time, the strongest wind that could be artificially produced was generated by an airplane engine reaching a wind speed of 136 mph. CSSB member products

withstood that wind speed and passed the test.

Category 3-5 hurricanes wreak havoc on even the strongest built communities. Through structural damage assessment, the insurance industry has recognized the need for better buildings, and has developed the Fortified...for safer living® program. This program advocates building stronger, better constructed homes that go beyond basic building code requirements.

Wind Resistance Test Results are Outstanding

In 2004, CSSB member cedar shakes and shingles underwent the UL-1897 (fourth edition) "Uplift Test for Roof Covering Systems" with exemplary results of 90 PSF (173 MPH) for CSSB member shingles and 180 PSF (245 MPH) for CSSB member shakes.

Important note to above paragraph: A subsequent report to the UL-1897 fourth edition "Uplift Test for Roof Covering Systems" by a Florida Registered Professional Engineer converted results, using no safety factors. Extrapolation calculations were performed for a specific house in the Dade County area of Florida using the analytical method for wind design of roof cladding set forth in Section 6 of ASCE-7-98 (American Society of Civil Engineers). For a full engineer's report contact the CSSB.

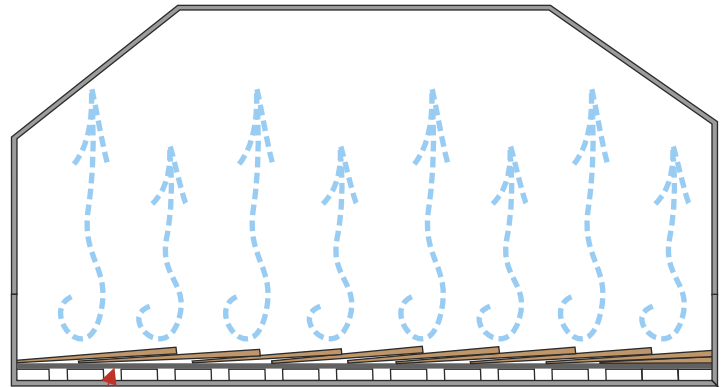


Figure 8. UL 1897 Wind Uplift Test

— Polyethylene sheet to prevent pressure loss between battens and shakes or shingles during wind uplift test.

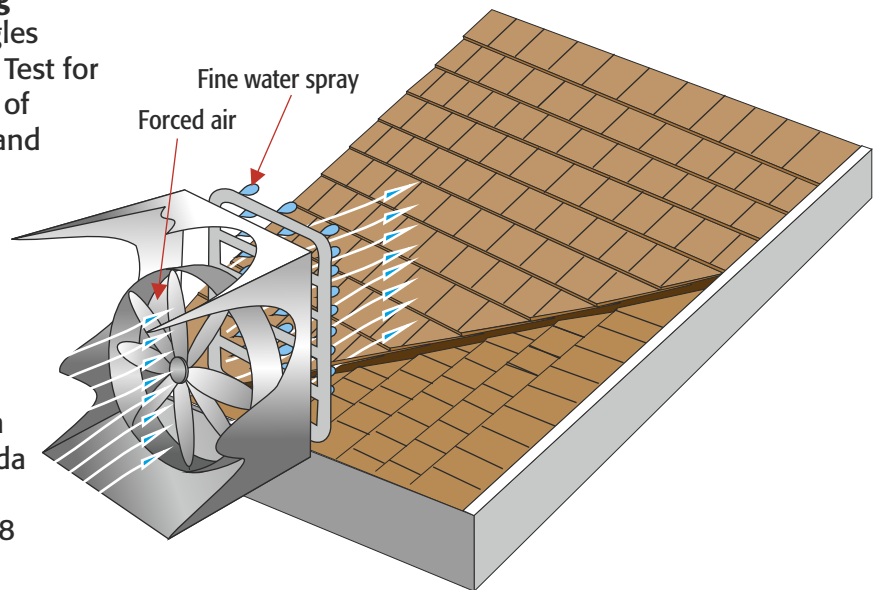


Figure 9. TAS 100-95 Uplift Test

CSSB member products have met stringent Dade County, Florida requirements. Dade County, Florida, is considered to have the toughest wind resistance regulations in all of North America and roofing products are evaluated using TAS 100-95 Uplift Testing. Water is also added into this test's windstream to ensure the roof deck is free from leakage.



Caution: not all cedar products are alike, of the same quality standard, or hold the same test results. CSSB test results are only applicable to CSSB member products. Ask to be sure!

IMPACT RESISTANCE: DEFINITION AND TESTING



Cedar roofing is very resistant to hail damage. Impact resistance testing shows minimal impact on CSSB member handsplit and resawn shakes, tapersawn shakes and shingles. Typical hail sizes are shown in the diagram to the right.

CSSB member shakes and shingles have withstood the impacts of 2" diameter steel balls when dropped from a 20 foot height as per UL-2218 test standards. UL-2218 is the standard impact resistance test used by all products in the roofing industry.



As a result, CSSB member manufacturers can offer Class 3 and Class 4 designations. Class 4 is the highest impact resistance rating one can obtain. Moreover, the impact resistance ratings in the UL-2218 test standard are the same for all products, regardless of type. Class 4 is Class 4, whether one is discussing cedar, asphalt, metal, tile or other roofing materials. The standards are the same. Even better, it's simple to replace a few shakes or shingles with no requirement for matching color lots or concern about chipping or peeling of surface coatings.

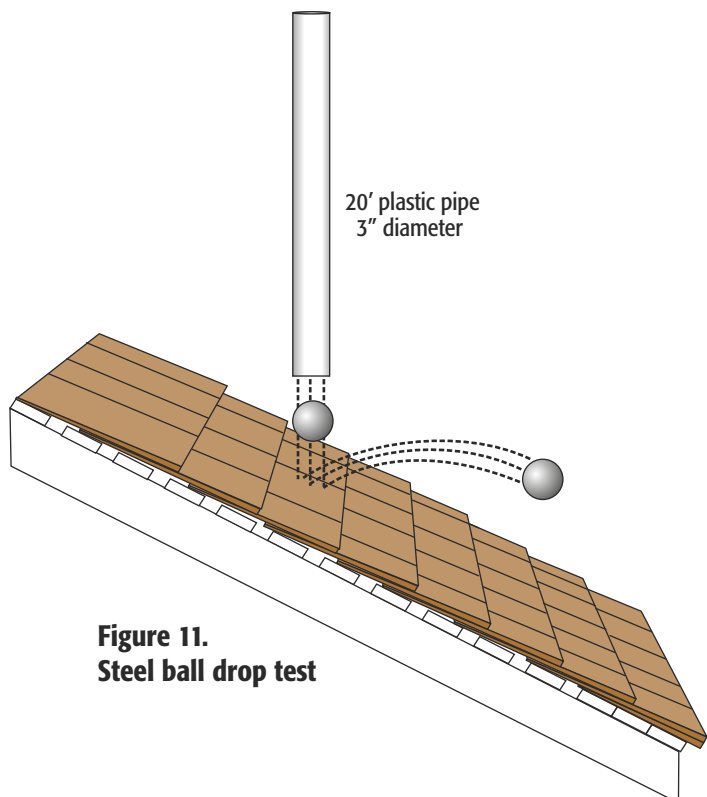
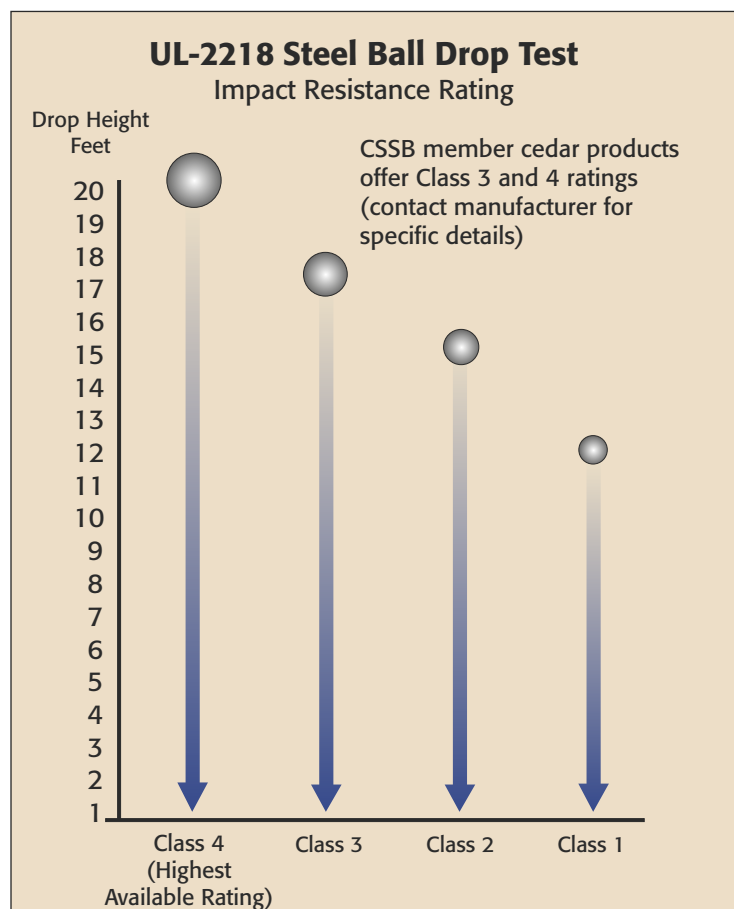


Figure 11.
Steel ball drop test



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GLOSSARY OF BUILDING CODE RELATED TERMINOLOGY

Building Code Official: Also known as 'Building Official'. The person hired by a given jurisdiction to ensure that building code regulations are followed and enforced. Is involved with reviewing variances requested in the building permit process. Usually an active contributor to city council decisions regarding commercial and residential buildings/developments. The first person to contact in a jurisdiction when a question about applicable building codes exists.

Building Inspector: Person who visits job sites to review structural soundness and integrity. A written and detailed report is usually provided to the client.

Bundle label: Label found under the strap holding a bundle of shakes or shingles together. Includes items such as product type, dimensions, grade, manufacturer, and building code compliance.

Butt: End of the shake or shingle exposed to the weather.

Canadian Standards Association (CSA): A standards writing organization that writes the standards in Canada.

CSSB-97: Current Western Red Cedar shake and shingle grading rules as accepted by and published in international building codes.

Class A: Roofing systems intended for use on highly fire resistant buildings and are required on institutions such as hospitals or jails. Class A roofing systems include cedar roofing products manufactured by CSSB members.

Class B: Roofing systems required for use on apartment buildings, condominiums and commercial buildings and are often recommended for use on dwellings in high fire hazard areas, such as wildland interface urban areas. Class B roofing systems include cedar roofing products manufactured by CSSB members.

Class C: Roofing systems which are the most commonly specified for single family dwellings and duplexes when fire retardant roofing is desired. Class C roofing systems include cedar roofing products manufactured by CSSB members.

Dade County: County in Florida famous for mandating the strictest wind resistance requirements in the nation. Products that meet Dade County requirements are better choices for hurricane prone areas.

Flat Grain: Annual growth rings form less than 45 degree angle with product surface. Up to 20% flat grain is permitted in each Number 1 Grade shake bundle. No flat grain is allowed in Premium Grade shakes or Number 1 Grade shingles.

Fortified...for safer living® program: Home building program incorporating better than code standards for greater resistance to the perils of nature. Developed and administered by the Institute for Business & Home Safety, it specifies construction, design and landscaping guidelines to increase a new home's resistance to natural disaster from the ground up (visit www.ibhs.org for more information).

Institute for Business & Home Safety (IBHS): Association for insurance companies. Mission statement is to reduce the social and economic effects of natural disasters and other property losses by conducting research and advocating improved construction, maintenance and preparation practices (www.ibhs.org).

International Building Code (IBC): The set of building code regulations for commercial structures written by the International Code Council.

International Code Council (ICC): Organization created by merger of Building Officials and Code Administrators International, International Conference of Building Officials and Southern Building Code Congress International. Responsible for publishing the IRC and IBC building codes.

International Residential Code (IRC): The set of building code regulations for residential structures written by the International Code Council.

Length: Measurement used to distinguish certain product types. Typical cedar shakes are 18" or 24" in length. Shingles are available in 16" FiveX, 18" Perfection, or 24" Royal lengths. Custom dimensions are available for shakes and shingles.

Pressure Impregnated Treatment Process: Process that uses pressure to force either fire retardant OR preservative treatments into the cells of the wood, locking it inside. This is not a spray on treatment that will leach out after a rain storm.

Red Tagged Building: Stop work order put on building (usually under construction) if code requirements are not being met.

Stormchaser: Typically a fly-by-night, low quality, inexperienced and unscrupulous roofing contractor who operates from town to town, following storms and leaving behind his or her own path of destruction with unsuspecting homeowners.

Structural Damage Assessment: Work typically performed in the field by deployment teams to analyze the impact of severe storms on buildings' resistance to damage.

Texas Department of Insurance (TDI): The Texas Department of Insurance regulates the Texas insurance industry and its work includes public education about insurance and building products (www.tdi.state.tx.us).

UL 1897: Test standard for measuring uplift resistance of roofing products. Ratings are in psi and can be converted to miles per hour using engineering calculations.

UL 2218: Test standard for measuring the impact resistance of products. Ratings are Class 1 (lowest) to Class 4 (highest) and are the same for all roofing materials, regardless of product type. Product test results have been used to provide insurance discounts for homeowner policies.

Uniform Building Code (UBC): The set of building standards followed in most jurisdictions in the United States that have not yet adopted the new ICC-authored codes.

Vertical Grain: Also known as Edge Grain. Annual growth rings form 45-90 degree angle with the product surface.

Western Red Cedar: Most common species of cedar shakes and shingles. Color can vary from dark chocolate brown to light pink, and will weather to a gray shade. Latin name is *Thuja plicata*.

Yellow Cedar: Shakes and shingles that weather to a lighter, more silvery gray than Western Red Cedar. Also known as Alaskan Yellow Cedar or Western Cypress. Latin name is *Chamaecyparis nootkatensis*.

Q: Does the CSSB offer roof inspection services?

A: No, this is not within the mandate of the CSSB. Some CSSB affiliate members, however, do provide this type of service - check the member listings for more information.

Q: How do I find a CSSB member in my area?

A: Check the member listing at www.cedarbureau.org, or telephone 604-820-7700.

Q: Where can I obtain information on how to install a roof?

A: This information is located at www.cedarbureau.org in the CSSB's New Roof Construction Manual. If you do not have Internet access, a free copy can be mailed to you from the CSSB office.

Q: Where does the CSSB offer training seminars?

A: Seminars are offered across the United States and Canada. Contact the District Manager in your area for scheduling details.

Q: Does the fire retardant treatment leach out after a rainstorm?

A: The pressure impregnated fire retardant treatment is locked into the cells of the wood at the factory, and does not wash away after rainstorms. It does not need to be reapplied after factory treatment.

Q: Can I get a pressure impregnated treated product with both fire retardant AND preservative treatment?

A: No, not at this time.

Q: How is the fire retardant treatment applied?

A: Through pressure injection at the factory, a special fire retardant treatment is forced into the cells of the wood. Kiln drying solidifies the formula and locks in fire protection. This is not a topical spray on, after-market treatment that could leach out after a few rain cycles. Re-application of the treatment is not required.

Q: How is the treatment tested?

A: CSSB member pressure impregnated fire retardant treated cedar shakes and shingles provide fire protection locked into the roofing material, proven over and over in eight rigorous (Underwriters Laboratories, Inc. and Underwriters' Laboratories of Canada) designed tests:

1. Intermittent Flame Test without amended rain test
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5. Intermittent Flame Test after amended rain test
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7. Flying Brand Test after amended rain test
8. Natural Weathering Test

The Intermittent Flame, Burning Brand and Flying Brand Tests are redone after the natural weathering of 1, 2, 3, 5 and 10 years.

Q: What about flying embers?

A: When a fire starts in a neighborhood, firefighters and homeowners are often concerned about flying embers landing on a neighbor's roof and igniting another home. Part of the testing process of pressure impregnated fire retardant treated products requires the products to pass a Burning Brand Test, Flying Brand Test, as well as a Spread of Flame Test.

Burning Brand Test: requires that flaming blocks of wood (called brands) be placed directly on the test deck at locations considered to be the most vulnerable and are allowed to continue to burn until they are completely consumed. Conditions for acceptance: there may be no burn through or sustained flaming on the underside of the deck.

Flying Brand Test: requires that wind and flame be applied to a deck and the test requires that no flying, flaming or glowing embers or brands be blown or fall off the test deck.

Spread of Flame Test: requires test decks to be subjected to a gas-fed flame for an extended, uninterrupted period using temperatures of approximately 1350 degrees Fahrenheit and an air speed of 12 mph. Conditions for acceptance: flaming shall not have spread beyond six feet for Class A, eight feet for Class B and thirteen feet for Class C. There shall have been no significant lateral spread of flame from the path directly exposed to the test flame.

Thank you.

The Cedar Shake & Shingle Bureau offers its sincere thanks to the numerous professionals from the insurance, roofing, building envelope and construction industries/associations/groups who gave so generously of their time and expertise.

This project has been a true team effort.

Production
assistance
provided by:



Contact the CSSB regarding:

- Technical assistance and literature
- Product type and installation demonstrations
- Education for insurance teams, homeowner associations and builders
- American Institute of Architects continuing education seminars
- Florida State Course Provider classes



Contact the CSSB for more information:

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