

CRES-X PRODUCT BROCHURE

PRODUCT NAME

CRES-X

PRODUCT USE

CRES-X is designed to be installed as single-layer structural subflooring (combination subfloor and underlayment) for residential or commercial on-site and factory built construction and can be installed on floor joists spaced up to 24" OC.

MANUFACTURER

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PRODUCT DESCRIPTION

CRES-X is an Exposure 1 rated, engineered wood, structural use panel that has been designed, manufactured, tested and certified to meet all requirements of the U.S. Department of Commerce, Voluntary Product Standard PS 2-92 (04), a performance standard for wood-based structural-use panels. As an Exposure 1 rated panel CRES-X is bonded with exterior grade glue and is "suitable for uses not permanently exposed to the weather, but where exposure durability to resist effects of moisture due to construction delays, high humidity, water leakage, or other conditions of similar severity is required". CRES-X is manufactured with Douglas Fir and Redwood raw materials and is bonded with exterior grade melamine urea-formaldehyde (MUF) glue to produce a single-layer floor decking panel that provides strength, stability and water resistance.

CRES-X ADVANTAGES

25 year warranty, the largest "single piece over-sized" floor decking panels available, faster construction, lower labor costs, squarer floors, fewer floor seams, less seam sanding, fewer fasteners required, thicker than OSB or plywood, fewer joists required (up to 24" OC spacing), smoother surface, harder surface, reduced floor squeaks and noise, less trim and panel damage loss during construction, minimal packaging (reduces waste disposal costs), SCS environmental certification, solid core (no voids), stiffer and flatter.

BUILDING CODE APPLICATIONS

Products conforming to PS 2 92 (04) are written into and accepted by virtually all building codes. CRES-X meets all requirements of PS 2 92 (04) and is designed and manufactured to meet the requirements of the following codes for use as single-layer sub-flooring to be installed in on-site or factory built residential or commercial construction. CRES-X is bonded with exterior grade MUF glue and carries an Exposure 1 rating. CRES-X is approved and suitable for uses not permanently exposed to the weather but where exposure durability to resist effects of moisture due to construction delays, high humidity, water leakage, or other conditions of similar severity is required.

- The 1997 Uniform Building Code (UBC) Section 2304.2, Sections 2312.1 and 23.20.9.2, Table 23-II-E-1, UBC Standard 23-3 (PS 2 92 (04)).
- The 1995 National Building Code of Canada NRC-CNRC Section 9.23.14.2.1.d, CAN/CSA 0325.0.
- The 2003 International Residential Code (IRC) Sections R503.2.1, R503.2.1.1 and R503.2.2, Table R503.2.1.1 (1), IRC DOC PS 2-92 (04) or in Canada, CSA 0325.0-92.
- The 1991 Department of Housing and Urban Development (HUD), Use of Materials Bulletin No. 40c (UM 40c) and PS 2 92 (04).

PS 2-92 CERTIFICATION

CRES-X is subject to performance testing and approval as outlined under U.S. Department of Commerce, National Institute of Standards, Voluntary Product Standard PS 2-92 (04), A Performance Standard for Wood-Based Structural-Use Panels. Voluntary Product Standard PS 2-92 (04) establishes requirements for assessing the acceptability of wood-based structural-use panels for construction sheathing and single-floor applications and provides a basis for common understanding among producers, distributors and the users of these products. Under PS 2-92 (04) certification is based on tests which are consistent with conditions and performance that approximate end-use conditions. Panels must be able to sustain the structural requirements of construction and/or occupancy, maintain bond integrity during normal exposure, and remain relatively stable during expected moisture exposure.

TESTING AND CONFORMANCE

PS 2 92 (04) covers the performance requirements of structural use panels. It also includes test methods to determine compliance, and a glossary of trade terms and definitions. A quality certifications program is provided whereby a qualified third party testing agency inspects, samples and tests products for qualification under this standard. All structural-use panels represented as conforming to this standard shall meet or exceed all applicable requirements of the standard and have met or exceeded all requirements for Panel Construction, Workmanship, Dimensions, Tolerances, Marking, Exposure Durability, Bond Durability, Grade, Size, Thickness, Squareness, Straightness, Uniform Load, Ultimate Load, Concentrated Static Load, Concentrated Impact Load, Lateral Fastener Loading, Direct Fastener Withdrawal, Linear Expansion, Thickness Swell, Stability, Mold Resistance, Bacteria Resistance, Resistance to Elevated Temperature, Moisture Content, Bending Stiffness and Bending Strength.

MATERIALS AND FABRICATION

Produced in Crescent City, California, CRES-X single-layer subflooring provides water resistance, engineered structural properties, stability, smooth surfaces, impact resistance and cost and labor efficiencies.

The surfaces are hard, tight and uniform and provide excellent fastener and gluing properties. The surfaces are suitable for the direct application of resilient floor covering or carpeting. The engineering and structure of CRES-X allows screws, staples and nails to seat properly and provides precise sawing and drilling.

SIZES AND THICKNESS

CRES-X is produced in a thickness of 3/4" for joist applications up to 24" OC and is available in a width of 96" and in lengths up to 24'. Tongue and grooved (T&G) edges (long edges) are available upon request.

PHYSICAL PROPERTIES

PROPERTY TESTED	PS 2-92 (04) REQUIRMENT	CRES-X PERFORMANCE
Deflection @ 200 lbs Concentrated Load Dry	0.108"	0.098"
Ultimate Load Dry	550 lbs	949 lbs
Deflection @ 200 lbs Concentrated Load Wet/Redry	0.108"	0.105"
Ultimate Load Wet/Redry	550 lbs	889 lbs
Uniform Load Deflection @ 100 psf Dry	0.053"	0.045"
Uniform Load Ultimate Load Dry	330 psf	330 psf
Product Thickness	0.719"	0.739"
Thickness Swell 24 Hour Water Soak	20.0%	8.14%

BACTERIA RESISTANCE

CRES-X has been certified to meet all requirements for adhesive bacteria resistance under PS 2-92 (04) Section 6.2.5.3 and testing in accordance with Section 1.15. Test show Cres-X meets the PS 2-92 (04) criteria for bacteria resistance.

INSTALLATION INSTRUCTIONS

Face stamp: All panels must be installed with the identification and certification stamp facing upward.

Joists and joist spacing: The floor joist system must meet all requirements of the jurisdictional code under which the home is being built. The lumber used to construct the joist system must be of an approved and suitable specie, grade and quality with a maximum moisture content not to exceed 15% at time of installation. Joist spacing in no circumstances shall exceed 24” except in cases where specific jurisdictional code requirements reduce the maximum allowable span to less than 24” in which cases the code dictates the maximum allowable span. On joists where panel seams occur, each panel edge shall be supported by not less than 40% of the nominal width of the joist. The complete perimeter (all four edges) of each panel installed must be in contact with and be supported by the floor joist system. In situations where panel edges run perpendicular to the floor joist system, panel edges must be Tongue and Grooved or be supported by gusset plates attached directly to the floor decking or by intermediate blocking attached to the floor joist system

Panel Positioning: Building a square floor assembly is critical to assure quality construction and to eliminate and/or minimize problems throughout the entire construction process. Therefore, the installation of the first panel of floor decking on the joist system is very important in squaring the entire floor assembly. The large 8’ wide full-length panels of CRES-X which are precision cut to tight tolerances including squareness, length and width are ideally suited to this important step of quality construction. As the first panel of CRES-X is installed make certain all perimeter areas of the joist system align perfectly with all edges of the panels. Panels should never require being “forced” into position to match the joist system. If the joist system is properly constructed and square to begin with, only mild coaxing at most should be required to gain alignment between the CRES-X and the joist system. Proper positioning can be attained by physically pushing on the joist system or using an “extended” pipe clamp to pull the joist system into alignment with the edges of the floor decking. NEVER beat on the floor decking or the joist system to gain alignment as this can damage the floor decking and/or the joist system and may contribute to future floor issues.

Gapping: An expansion gap of not less than 1/16” and not greater than 1/8” is recommended between the panel edges of non-acclimatized CRES-X . CRES-X panels that have undergone a minimum of 16 days of acclimatization at the factory in Crescent City, CA can be lightly butted together without a gap. Acclimitized panels can be identified by an “SA” marking stenciled on each unit.

Gluing: Bonding CRES-X panels to the floor joists with an approved construction adhesive is highly recommended and is mandatory when it is required under the jurisdictional building code. Bonding floor decking panels to the joists increases the structural integrity of the floor system and can reduce or eliminate floor squeaks and noise. All adhesives must meet the minimum requirements of the jurisdictional building code. When adhesives are used, the panels must be installed within the working open time of the adhesive (typically less than 5 minutes) to prevent and avoid the adhesive curing before the panels are installed. It is recommended that adhesive be applied to “sections” of the floor joist system to prevent pre-curing of the adhesive before all floor panels can be installed. Applying the adhesive to the entire floor joist system before installing the floor decking is not recommended and should always be avoided as this is the primary cause of glue pre-cure. In addition, the adhesive must be given an appropriate amount of time to cure before any use or movement of the floor is allowed. CRES-X panels must be lowered vertically onto the floor joist system. Do not slide panels around on floor joists after adhesive is applied as this will remove the glue which will contribute to inadequate bond between the floor decking and the floor joists. CRES-X panels must be lowered directly onto the

floor joist system with minimum movement to insure proper bonding. Adhesives used to bond the floor decking to the joist system must be used in strict accordance with the manufactures use and installation instructions.

Fasteners: Fasteners must be installed along all edges and in the field where intermediate joists support each panel. Fasteners must be installed not less than 6" OC along all edges and 12" OC along all field joists. Recommended fasteners include #8 self tapping screws threaded to within 1/2" of the head or 8d duplex, ring-shank , spiral or adhesive coated nails or 16 gauge, 7/16" crown, chisel point, adhesive coated, staples or a combination of these fasteners. Fasteners must penetrate a minimum of 1 1/2" into the supporting floor joists. Fasteners should be installed perpendicular to the panel surface and no closer than 3/8" to panel edges. Maintain a minimum distance of 2" between fasteners at all times. Fasteners should never be installed in close proximity to each other in tight "groups" as the over-installation of fasteners can reduce the strength of the joist system and the floor decking. When pneumatic tools or systems are used to install fasteners, monitor and adjust the air pressure as required to attain proper penetration and countersinking of all fasteners. Avoid "overdriving" fasteners and set or countersink all fasteners between 1/32" and 1/16" below the panel surface.

FINISH FLOOR COVERING

Prior to the installation of any finish floor covering the entire floor area to be covered must be inspected for dirt and damage caused during construction. All damaged, pitted or gouged areas must be filled with an approved hard floor patching compound or filler. Once properly cured, the entire floor should be sanded smooth to eliminate all uneven repairs, areas or seams. The area to be covered should be cleaned of all dust, dirt and/or construction debris prior to the installation of any finish floor covering or underlayment. Once all necessary repairs, leveling, sanding and cleaning have been completed, the finish floor covering can be installed.. Resilient sheet and tile goods including vinyl, linoleum, rubber or cork should not be thinner than 1/16". Solid or engineered wood, bamboo or laminate flooring products should not be thinner than 1/4". When fasteners are used to install solid or engineered hardwood or bamboo, staples rather than nails must be used. Tile or natural stone or rock should never be installed directly over CRES-X. Ceramic floor tile or natural rock or stone can be installed only after a minimum 1/4" tile backerboard such as Duroc, Hardibacker or an equivalent is first installed over the CRES-X or when the Daltile Dal-Lath system of installation is used. And, when tile is installed over CRES-X covered with tile backerboard, joist spacing must not exceed 16" OC. Contact Hambro Forest Products, Inc., for recommended installation instructions regarding various finish floor covering materials including; carpeting, linoleum, sheet vinyl, composition vinyl tile, rubber, cork, solid hardwood strip, engineered hardwood plank or parquet, engineered hardwood longstrip, bamboo, laminate, ceramic tile or natural rock or stone such as granite, marble, limestone or slate.

STORAGE AND HANDLING

CRES-X is an Exposure 1 rated structural panel and is bonded with exterior grade MUF glue. However, as with all dry wood products, store CRES-X on a flat surface off the ground in a clean dry area under cover to maintain the highest quality product at time of installation. When stored outside CRES-X should be covered with plastic sheets or tarps with the covers open and away from the sides and bottom to allow adequate air circulation until installed. Additional protection may be appropriate during periods of severe weather. Store units or panels on flat surfaces supported by a minimum of three stickers for 8' long units. Add a minimum of one additional

sticker for each two foot increment in panel length. Limit the height of the stack to 4 or 5 units. All stickers between units must be of equal thickness and all stickers must be aligned vertically between units throughout the stack.

ENVIRONMENTAL ADVANTAGES

As with all products produced by Hambro Forest Products, Inc., CRES-X is manufactured in accordance with the company's policy on protection of the environment, which includes:

- Using environmental control technology and energy efficient equipment to conserve resources.
- Using process by-products to produce energy, thereby conserving nonrenewable energy resources.
- CRES-X is certified by Scientific Certification Systems (SCS) to contain 100% recovered materials.



- CRES-X is produced in strict accordance with all applicable environmental laws of the Federal, State and local governments including: Federal Environmental Protection Agency, California Environmental Protection Agency, California North Coast Air Quality Management District, California State Water Resources Control Board, California North Coast Regional Water Quality Control Board, California Fish and Game Department, California Coastal Commission and Del Norte County Environmental Health Department.

MATERIAL SAFETY DATA SHEETS

Materials Safety Data Sheets (MSDS) for Cres-X are available at www.cresdek.com . or write or call, Hambro Forest Products, Inc., P.O. Box 129, Crescent City, CA 95531. 707-464-6131.

25 YEAR WARRANTY

CRES-X floor decking carries a 25 year limited warranty and is guaranteed to meet or exceed the minimum physical properties and performance standards of PS 2 92 (04) at time of delivery to the builder. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty extends only to the original home buyer. Any expressed warranty contained herein is conditioned upon the original home buyer providing Hambro Forest Products, Inc., by registered mail at P.O. Box 129, Crescent City, CA 95531 the following:

- 1.) A detailed written notice explaining the floor problem.
- 2.) AND, a detailed written explanation outlining why the CRES-X floor decking is defective.

In addition, Hambro Forest Products, Inc., must be given a minimum of thirty (30) days from receipt of the notice and explanation to inspect the floor prior to any alteration, change, modification or repair being performed. Hambro Forest Products, Inc., will not be held

responsible materials, labor or cost for which it has not provided prior written notice and approval.

In the event CRES-X floor decking does not comply with the warranty guarantee regarding physical properties and performance standards, Hambro Forest Products, Inc. will, at its sole discretion, do one of the following.

- A.) Refund the estimated cost of repairs including labor , floor decking, floor covering, adhesives and fasteners affected.
- B.) Or, repair the floor decking, floor covering, adhesives and fasteners affected.
- C.) Or, replace the floor decking, floor covering, adhesives, and fasteners affected.

The quality of any repairs and/or materials determined to be required and covered under this warranty will be equal to but not exceed the original materials installed by the builder. In addition, a pro-rated adjustment will be made relative to the useful life of the finish floor covering as advertised by the floor covering manufacturer (i.e. if, according to the floor covering manufacturer, linoleum were to have a useful life of 5 years and a problem occurred after 3 years, the value of the linoleum relative to repair or replacement would be placed at 40% of current cost for the same or equal quality replacement).

This warranty excludes any and all floor, floor component, or floor system failure/s which are the result of improper and/or inadequate installation of CRES-X floor decking, construction of the floor system or assembly, maintenance or venting of the floor or floor cavity, siting or set-up of the home, or any other floor, floor component, or floor system related failure/s that were not caused by nor related to CRES-X floor decking.

HAMBRO FOREST PRODUCTS, INC'S., WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED RO IMPLIED EXCEPT CONSUMER WARRANTIES REQUIRED BY LAW. IN NO EVENT SHALL HAMBRO FOREST PRODUCTS, INC., BE RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES * OF ANY NATURE OR KIND. INCLUDING, WITHOUT LIMITATION, INJURY OR DAMAGE TO PERSONS OR PROPERTY. THIS WARRANTY STATES THE ENTIRE LIABILITY OF HAMBRO FOREST PRODUCTS, INC., WITH RESPECT TO CRES-X FLOOR DECKING.

*Some states do not allow the exclusion or limitation of incidental or consequential damages.

HISTORY OF PS 2-92 (04)

During September 1988, a special Binational Committee (BNC) was formed and charged with the task of fostering the mutual objective to the United States and Canada with respect to the development and implementation of harmonized standards with regard to performance requirements for plywood. This action was a consequence of the implementation of the Free Trade Agreement (FTA) of 1987. In accordance with the Agreement, U.S. tariffs on plywood and other structural panels could not be removed until the trade issues involving plywood standards were resolved. Of concern to the United States was the fact that certain grades of plywood permitted in PS-1 were not covered in Canadian plywood standards and consequently, not acceptable under Canadian building codes.

The BNC began its task by reviewing the existing industry standard of the American Plywood Association (APA), APA PRP-108, *Performance Standards and Policies for Structural-Use panels*, and the Canadian Standards Association (CSA) standard series, CAN/CSA-0325, *Construction Sheathing*, to identify the technical differences and to consider the roles the standards might play in resolving the plywood trade issues. It concluded that the development of common criteria embodied in performance-based national standards offered a means to resolve the trade issue.

Next, the BNC sponsored a joint U.S./Canadian study designed to produce additional comparative information on U.S. and Canadian plywood. Based on BNC's assessment of the technical differences in the APA and CSA standards and the data derived from the joint study, the BNC in November 1990 submitted new U.X. and Canadian draft standards, respectively, to the National Institute of Standards and Technology (NIST) in the United States and the CSA in Canada for processing as national consensus standards.

In March 1991, the APA signed an agreement with NIST to support development of the proposed U.S. performance standard as a Voluntary Product Standard (VPS) under procedures of the U.S. Department of Commerce. In April 1991, NIST established a Standard Review Committee under the VPS Program to assume responsibility for development of the U.S. standard. On October 15, 1991, after two 30-day review periods and some editorial changes, the Committee recommended unanimously that the proposed standard be prepared for public review and acceptance as a Voluntary Product Standard.

In March 1992, the proposed VPS standard was distributed to a list of manufacturers, distributors, consumers and others who might have interest in the subject standard, and on April 8, 1992, NIST announced in the Federal Register the public circulation of the proposed standard and invited public comment. A 75-day comment period was allowed. Following public review of the standard, which ended June 22, 1992, NIST determined that the responses indicated consensus among producers, distributors and consumers in accordance with the published procedures. The standard was approved for publication by NIST as Voluntary Product Standard PS 2-92, *Performance Standard for Wood-Based Structural-Use Panels*, on August 27, 1992. PS 2-92 was revised during 2004 and is now referenced as PS 2-04.

The new U.S. standard is not intended to replace existing standards such as Voluntary Product Standard PS 1-83, *Construction and Industrial Plywood*, but to serve as an alternative performance-based standard that would relate to a variety of forms of structural panels: plywood, waferboard, oriented strand board, structural particleboard, and composite panels.