Flood Damage-Resistant Material Considerations

Introduction

This technical bulletin provides information on acceptable use of wood building materials in Special Flood Hazard Areas (SFHA) as defined by FEMA. The National Flood Insurance Program (NFIP) defines a Base Flood Elevation (BFE) in SFHAs based on the expected height of flood water during a flood that has a 1% chance of being equaled or exceeded in any given year (commonly called the 100-year flood). For all new construction within SFHAs, the NFIP requires the use of flood damage-resistant structural and finish materials below the BFE.

Flood Damage-Resistant Materials Requirements (FEMA Technical Bulletin 2) provides additional guidance regarding minimum floor heights relative to the BFE and flood damage-resistant materials. Additional information can be found in *Home Builder's Guide to Coastal Construction* (FEMA P-499), which is a compilation of 37 fact sheets providing technical guidance for the construction of coastal residential buildings.

What is "Flood Damage-Resistant Material"?

The NFIP defines a flood damage-resistant material as "any building material capable of withstanding direct and prolonged contact (i.e., at least 72 hours) with floodwaters without sustaining significant damage (i.e., requires more than cosmetic repair)." The cost of cosmetic repair should be less than the cost of replacing building materials. In addition, combinations of otherwise flood-resistant materials that trap water and prevent drying after a flood are not permitted below the BFE.

Unacceptable Wood Materials Below BFE

The following are examples found in FEMA Technical Bulletin 2 of wood materials that are unacceptable below the BFE:

- Hardboard
- Particleboard
- OSB
- I-joists
- Materials that become dimensionally unstable when subject to wetting and drying
- Materials that absorb water excessively or maintain high moisture content after submergence
- The material contains normal adhesives, which are specified for above-grade use and water soluble or not resistant to alkali or acid in water, including groundwater seepage and vapor.
- The materials contain wood or paper products or other materials that dissolve or deteriorate, lose structural integrity, or are adversely affected by water

Acceptable Wood Materials Below BFE

The following are examples found in FEMA Technical Bulletin 2 of wood materials currently considered flood damage-resistant:

- Sawn lumber (untreated, preservative-treated, or naturally durable)
- Plywood (exterior grade, marine grade, or preservative-treated)

Additionally, FEMA Technical Bulletin 2 allows for materials and products not listed to be evaluated for flood damage-resistance requirements using the manufacturers' literature (i.e., specifications, materials safety data sheets, test reports) or to be used if accepted by the local official.

Many jurisdictions will provide a list of approved flood-resistant materials that can be used in their local coastal environments. Check these lists and include all proposed construction and materials in approved plans.

Weyerhaeuser Engineered Wood Products

Two ASTM standards, E3075 and E3369 provide guidance to determine if products, other than those listed in FEMA Technical Bulletin 2, are acceptable as flood damage-resistant materials. ASTM E3075 provides flood exposure criteria for testing, and ASTM E3369 provides performance criteria for flood-damage-resistant materials. In addition to the flood-damage-resistant wood materials listed in FEMA Technical Bulletin 2, ASTM E3369 identifies, "preservative treated structural composite lumber meeting requirements of American Wood Protection Association (AWPA) U1 Standard Use Category 4A (UC4A) or higher" as a flood-damage-resistant material. Other structural wood materials can be evaluated based on performance criteria in E3369, including requirements for drying, dimensional stability, the ability to be cleaned, and established wet-use design values.

All Weyerhaeuser engineered wood products (EWP) are durable (constructed with exterior grade, waterproof adhesives) and expected to be exposed to moisture during construction. However, Weyerhaeuser EWP may experience permanent swelling and changes in structural properties after exposure to flooding, which are not permitted by ASTM E3369 for flood-damage-resistant materials. Therefore, with an exception for Treated Parallam Plus® PSL, these products are not recommended for use below the BFE.

Treated Parallam® Plus PSL has been effectively flooded during the treating process, and the effects of this exposure on product dimensions and strength have been considered in the product manufacturing process and in the establishment of design properties. In addition, it meets the treatment retention levels of UC4A. Based on comparison to acceptable wood materials in FEMA Technical Bulletin 2 and its long history of performance as an outdoor treated wood, Weyerhaeuser believes Treated Parallam® Plus PSL meets the intent of the NFIP for construction below the BFE. In addition, Treated Parallam Plus® PSL is considered as a flood-damage-resistant material based on ASTM E3369. For additional information, reference *Trus Joist® Treated Parallam® Plus PSL Specifier's Guide* (TJ-7102).

TABLE 1. FLOOD DAMAGE-RESISTANCE OF TRUS JOIST® PRODUCTS

Weyerhaeuser EWP	Flood Damage-Resistant, Acceptable Below BFE?
Treated Parallam® Plus PSL	Yes
TJI® Joist, TJ® Rim Board	Not allowed per FEMA Technical Bulletin 2
TimberStrand® LSL, StrandGuard® TimberStrand LSL, Microllam® LVL, and Parallam® PSL	Not recommended, may experience permanent swelling and change in structural properties after flooding

If you have any questions, please contact your Weyerhaeuser representative.

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