Preservative and Fire-Retardant Treated Plywood

Preservative Treated

Preservative treated plywood is intended for applications where the plywood is susceptible to attack by decay causing organisms and insects. Many of these applications involve exposures to environmental conditions where the moisture content of the plywood panels will exceed 20 percent for extended periods of time. These conditions provide ideal environments for decay fungi and termites that use the cellulose in the wood as food.

Common uses of preservative treated plywood include concrete forming and all-weather wood foundations. When treated plywood is required for a particular application, the user should specify the retention level and after-treatment moisture content when treated with water borne preservative. Building codes require that the treating and redrying be conducted in accordance with requirements of the American Wood Protection Association (AWPA) and that the treated panels bear the mark of an agency certified to inspect preservative treated wood products.

Plywood certified as having a bond classification of Exposure 1 or Exterior can be treated with preservative chemicals, although certain applications, such as permanent wood foundations, are limited to Exterior plywood only. The Exposure 1 and Exterior bond classification requirements are specified in U.S. Department of Commerce Voluntary Product Standard PS 1, Structural Plywood. Bond classification, as defined in PS 1, is related to the moisture resistance of the glue bond under intended end-use conditions and does not relate to the physical (erosion, ultraviolet, etc.) or biological (mold, fungal decay, insect, etc.) resistance of the panel. Plywood with an Exterior bond classification is suitable for repeated wetting and redrying or long-term exposure to weather or other conditions of similar severity. Plywood with an Exposure 1 bond classification is suitable for uses not permanently exposed to the weather and is intended to resist the effects of moisture on structural performance as may occur due to construction delays or other conditions of similar severity.

Exterior plywood grades used for treating must consist of minimum “C” grade veneer and use only species classified as Group 1 or Group 2. The species Group Number is used to classify species covered by PS 1. Group Numbers include 1, 2, 3, 4 and 5. Strength and stiffness properties of species in Group 1 are typically highest, while the strength and stiffness properties of species in Group 5 are the lowest.

Treaters should be aware that some methods of pressure treatment exceed the pressures used in PS 1 for quality control bond durability tests. Span ratings are typically qualified before

treatment and may not apply to panels after treatment. Generally, plywood panels treated and redried in accordance with AWPA Standard U1 have the same structural design capacities that applied prior to treatment. Panels treated and redried in accordance with AWPA U1 will bear a corresponding label or tag, and the code-recognized inspection agency will also be identified.

Fire-Retardant Treated

Per Section 2303.2 of the 2015 Edition of the International Building Code (IBC), "Fire-retardant-treated wood is any wood product which, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame spread index of 25 or less and show no evidence of significant progressive combustion when the test is continued for an additional 20-minute period. Additionally, the flame front shall not progress more than 10-1/2 feet (3,200 mm) beyond the centerline of the burners at any time during the test."

Specifically addressing wood structural panels, Section 2303.2.5.1 of the 2015 IBC provides that "…The effect of treatment and the method of redrying after treatment, and exposure to high temperatures and high humidities on the flexure properties of the fire-retardant-treated softwood plywood shall be determined in accordance with ASTM D5516. The test data developed by ASTM D5516 shall be used to develop adjustment factors, maximum loads and spans, or both, for untreated plywood design values in accordance with ASTM D6305. Each manufacturer shall publish the allowable maximum loads and spans for service as floor and roof sheathing for its treatment."

Therefore, in accordance with code requirements, the company providing the fire-retardant treatment and redrying service is responsible for treated panel structural capacity information. While this means that the span ratings and load capacities applicable to the plywood panels prior to fire-retardant treatment may not apply after treatment, specific design information will be available for the treated panels. The span ratings that were applied prior to treatment may be used to identify panels for which specific post-treatment structural capacities apply.

Fasteners for use with Preservative and Fire-Retardant Treated Plywood

Section R317.3 of the 2015 International Residential Code (IRC) addresses fasteners and connectors in contact with preservative and fire-retardant treated wood. In general, fasteners—including nuts and washers—and connectors in contact with preservative-treated wood shall be of hot-dipped zinc galvanized steel, stainless steel, silicon bronze, or copper. While the IRC defers to the connector manufacturer's recommendations for coating types and weights, the code also specifies minimum requirements in the absence of manufacturer recommendations.

For fasteners in contact with fire-retardant-treated wood in exterior or wet or damp applications, the IRC specifies use of hot-dipped zinc-coated steel, stainless steel, silicon bronze, or copper fasteners. However, the IRC specifies a minimum coating weight of ASTM B 695 Class 55 for mechanically deposited zinc-coated steel.