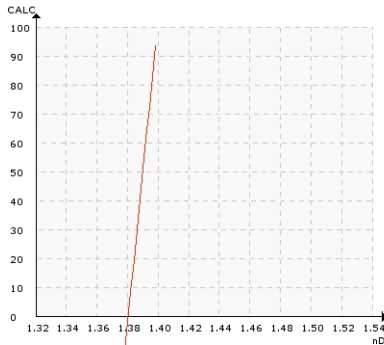


ACETIC ANHYDRIDE, (CH₃CO)₂O

Typical end products

Acetylated (durable) wood timber for window frames, doors, shutters, cladding, siding, facades, decking and garden furniture

Chemical curve: Anhydride in Acetic acid R.I.per Conc% b.w. at Ref. Temp. of 20 °C



Introduction

Acetylated wood timber is rapid growth wood (generally the cheapest wood available), which has been treated to have better dimensional stability, durability, UV resistance and paint retention.

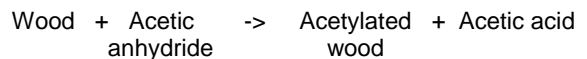
Application

The treatment technology is based on the acetylation process. Acetic anhydride (CH₃CO)₂O is used as a reagent for this process.

The physical properties of any material are determined by its chemical structure. Wood contains an abundance of chemical groups called "free hydroxyls" (represented as OH).

Free hydroxyl groups adsorb and release water, according to changes in the climatic conditions, which the wood is exposed to. This is the main reason why wood swells and shrinks. It is also believed that the digestion of wood by enzymes initiates at the free hydroxyl sites, which is one of the principal reasons wood is prone to decay.

Acetylation changes the free hydroxyls within the wood into acetyl groups. This is done by reacting the wood with acetic anhydride, which comes from acetic acid (known as vinegar when in its dilute form):




When a free hydroxyl group is transformed to an acetyl group, the wood's ability to absorb water is greatly reduced, rendering the wood more dimensionally stable and, because it is no longer digestible, extremely durable.

Installation

The K-Patents Compact Process Refractometer PR-23-AC is installed in the reactor feed to measure and maintain the correct concentration of Acetic anhydride in Acetic acid. The second installation point is in the recycling plant's distillation columns, where the spent chemical is recycled into the process. The refractometer assists in reducing the operating costs of distillation units via real-time process optimisation and control. The K-Patents refractometer is uninfluenced by bubbles or wood chips.

| | |
|---|----------------|
| CHEMICALS AND ALLIED | |
| APPLICATION NOTE | 4.06.04 |
| WOOD TIMBER TREATMENT: ACETYLATION PROCESS | |

Appropriate equipment with hazardous and intrinsic safety approvals are available when required.

| Instrumentation | Description |
|---|---|
|  | <p>K-Patents Sanitary Compact Refractometer PR-23-AC for small pipe line sizes of 2.5 inch and smaller.</p> <p>The PR-23-AC sensor is installed in the pipe bend. It is angle mounted on the outer corner of the pipe bend directly, or by a flow cell using a 3A Sanitary clamp or Varivent® connection.</p> |
| Area classification: | Intrinsic safety and hazardous area approvals available. |
| Measurement range: | Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight. |