HEXION
Specialty Chemicals

CASCOPHEN® G-1181-A With CASCOSET® G-1131-B For Radio Frequency Bonding

Description

CASCOPHEN® Resin G-1181-A with CASCOSET® G-1131-B is a two component resorcinol formaldehyde adhesive which is formulated for use in radio frequency cure application. The conductivity of G-1181-A is closely controlled. The resin is more conductive than typical resorcinol formaldehyde adhesives, but is significantly less conductive than phenol resorcinol formaldehyde adhesives. G-1181-A / G-1131-B is recommended for bonding all species of untreated woods where a completely durable bond is required. CASCOPHEN G-1181-A when used with CASCOSET G-1131-B produces a waterproof and boil-proof bond that will comply with ASTM D-2559-97.

As required by the Toxic Substance Control Act (TSCA), G1181-A is listed in the Chemical Substance Inventory. The CAS numbers for G-1181-A (resorcinol formaldehyde sodium salt polymer) and G-1131-B (paraformaldehyde) are [148906-95-0] and [30525-89-4].

Storage Conditions

G-1181-A should be stored in a closed container or tank at 21°C (70°F). At these conditions, the resin will remain in satisfactory, usable condition for at least one year. Containers must be kept tightly closed to prevent loss of solvent.

CASCOSET G-1131-B is a tan, free flowing powder that will remain usable for at least one year when stored at 21°C (70°F) in a sealed container. Adequate ventilation to remove dust and vapors should be provided in the storage area. The oldest inventory should always be used first.

Mixing Instructions

All mixing and spreading equipment should be clean and free from acids or alkalies. Containers that have been used to prepare other types of adhesive, such as urea-formaldehyde, melamine-urea formaldehyde and polyvinyl acetate, should be thoroughly cleaned because contamination may affect the usable life of the adhesive or cause premature gelation.

Adhesive Mix Composition	Parts by Weight
CASCOPHEN® G-1181-A	100
CASCOSET® G-1131-B	20

Add the powdered hardener to the resin portion and mix until the hardener is thoroughly dispersed. The mixed adhesive may be used immediately after mixing.

Working Life

Cooling the resin component to 4-14°C (40-58°F) before mixing and keeping the adhesive mix cool will increase the usable life. The relationship between adhesive mix temperature and working life is given below:

Mix Temperature, °C (°F)	Hours
10 (50)	6.0
16 (60)	4.25
21 (70)	2.0
27 (80)	1.0
32 (90)	0.5

Radio Frequency Cure

CASCOPHEN® G-1181-A with CASCOSET® G-1131-B is recommended for structural adhesive applications where the adhesive is cured with radio frequency equipment comprised of a generator, electrodes, a matching network of electrical leads connecting the electrodes to the generator and a hydraulic press to apply pressure during cure. Experience has shown that RF bonding is influenced by many factors, including adhesive composition, adhesive spread rate, adhesive squeeze-out, wood species, moisture content, joint design and RF equipment. The following factors must be closely controlled in order to maintain optimum performance:

- The frequency of the load, the electrodes and the electrical leads must be tuned to the frequency of the generator.
- Throughout the cure cycle, the output of the RF generator must be controlled to prevent arcing. An RF generator set to cure urea or urea modified melamine adhesives may require adjustments in the electrical output in order to run resorcinol adhesives.
- Adhesive spread rate and assembly time must be regulated and closely controlled to minimize squeeze-out and maintain adequate adhesive in the bond line.
- Electrode configuration with respect to the bond lines is critical.

There are many methods of estimating cure requirements for bonding by RF. These methods are dependent upon relative position of the bond lines with respect to the electrodes and at best give a rough estimate of the cure cycle.

Parallel or "bond line" heating is the most efficient method of RF curing. Here the bond lines are placed between the electrodes, parallel to the RF field. The bond lines have a higher dielectric loss factor than the wood and selectively receive the RF energy. For this reason, the bond lines heat faster than the wood and cure rapidly. It has been estimated that one hundred square inches of bond line will cure within 60 seconds at one kilowatt of RF power. However, some energy is lost in heating the mass of wood between the electrodes. Thus, as the size of the member to be cured increases, more energy is lost heating wood and longer cure cycles will be required.

Perpendicular or "mass" heating can be used effectively in curing large bond line areas of stock having relatively small cross sections, e.g., plywood. In "mass" heating, the bond lines are perpendicular to the RF field and the RF energy heats both the wood and the adhesive. In this type of press, one kilowatt of RF power will cure one pound of wood and adhesive in approximately one minute.

Although arcing in the bond line can virtually be eliminated, occasional arcs may occur. In the event of minor arcs with minimal carbonization, cure of the adhesive may be completed by lowering the RF power. When arcing with

carbonization occurs, the damaged wood must be removed from the press and all carbon deposits must be removed from the electrodes.

Wood Preparation

For best results the wood to be bonded should be surfaced within 24 hours of gluing so that smooth, clean, accurately fitting surfaces are provided. Surfaces should be free from raised or torn grain, skips, burns, glaze or other imperfections that will prevent intimate contact. Lumber that is cupped or warped so much that it cannot be straightened when pressure is applied should not be used. The temperature of the wood should be at least 21°C (70°F).

Spreading

Use 40 to 50 pounds of adhesive mix per 1,000 square feet of joint when radio frequency curing Douglas fir constructions, 45-60 pounds per 1000 square feet when the substrate is Southern Yellow Pine. A brush, roller, or adhesive spreader should be used for applying the adhesive mix.

Precautions

When CASCOPHEN® G-1181-A is handled with proper protective equipment, worker exposure to hazardous components should remain within permissible limits. Because CASCOSET® G-1131-B contains formaldehyde, avoid prolonged contact with the powder. Frequent washings, good ventilation, protective creams and protective clothing are also recommended. Refer to the Material Safety Data Sheets for a description of potential health hazards. High standards of cleanliness will minimize health risks.

Clean Up

CASCOPHEN G-1181-A is completely miscible in water and is readily washed from mixing and spreading equipment with cool or warm water before the adhesive has hardened.

Before using any Hexion Specialty Chemicals, Inc. product, please be sure to read the Material Safety Data Sheet which was included with the shipment.

For more information contact your local Hexion Sales Representative or Customer Service Center (800) 441-9637.

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