

# Technical Data Sheet

## Aerodux-500

### Phenol-Resorcinol-Formaldehyde Structural Adhesive

#### Product Overview:

Aerodux 500 is supplied in three grades: 500F (Fast), 500M (Medium), and 500S (Slow). Hardener 501 is used with each formulation

Aerodux 500 liquid resins, when mixed with Hardener 501, provide a range of adhesive formulations which are fully weatherproof, and particularly suited to the manufacture of large laminated timber structures or other critical wood structures which are expected to be exposed to the elements. Additionally, they are resistant to acids, weak alkalis, solvents and to boiling water.

Aerodux 500 adhesives are simple to prepare. Both resin and hardener are liquids, and mixed in a 1:1 ratio. They meet the requirements of BS 1204, Parts 1 and 2 (Type WBP), BS 1203 (Type WBP), and DIN 68 705 (AW 100), and can be released in accordance with DCI and ARB regulations.

#### Adhesive Chemistry:

PRF adhesives are classified as thermosetting polymers and are produced by a condensation polymerization reaction between formaldehyde, phenol and resorcinol.

PRF adhesives are cold-setting with very high weather and water resistance as well as heat resistance to be used in products for exterior, humid and interior climates. PRF adhesives are mainly used in the production of load-bearing timber structures and are tested and approved by official testing bodies for use in the building industry.

#### Physical Properties, Aerodux 500 Resins (Slow, Medium, or Fast):

Appearance	Reddish-brown liquid
Viscosity at 70°F	40,000 to 111,000 centipoise (similar to ketchup)
Specific Gravity at 70°	1.13
Solids Content	52-58%
Flash Point	88°F (31°C)

#### Physical Properties, Aerodux 501 Hardener:

Appearance	Brown liquid
Viscosity at 70°F	1,300,000 to 1,800,000 centipoise (similar to Crisco)
Specific Gravity at 70°F	1.16
Solids content	69-73%
Flash Point	100°F (38°C)

#### Storage & Shelf Life:

Store these formulations sealed in their original containers in a cool dry location (5-20°C). Shelf life under these conditions is at least 1 year.

#### Preparation/Mixing:

Resin and hardener must be well mixed for proper cure. Proportions may be measured either by weight or by volume. Mix ratio is 1:1 for all three resins. Viscosity of the resulting mixture at 25°C is between 150,000 and 200,000 centipoise (about like tomato paste or peanut butter).

#### Pot Life:

Resin and hardener start reacting with each other once they are mixed with the reaction proceeding until the glue is completely cured. This reaction time is a direct function of temperature of the mixture. What is referred to as "Pot Life" defines how long the glue mix remains usable.

**Pot life in hours for various temperatures by resin type:**

Temperature (°C)	5	10	15	20	25	30	35
(°F)	41	50	50	68	77	86	95
500F	9	6	4	1.5			
500M			5.5	3	2	1	
500S					3.5	2.5	0.5

**Substrate Surface Preparation:**

Surfaces to be bonded must be free of dust or other debris. Smooth dense surfaces to be bonded should be thoroughly sanded. Best adhesion achieved between sanded surfaces rather than smooth planed surfaces.

**Substrate Moisture Content:**

Satisfactory results may be obtained when the moisture content of the surfaces to be bonded is within the range of 6-25% with best results achieved between 12-16%. Artificial drying will be required to reduce the moisture content to 16% or lower. Adjacent surfaces should not differ by more than 4% moisture content.

**Glue Spread:**

Apply an even coating of mixed adhesive to both the surfaces to be bonded. Under typical workshop conditions (temperatures around 65-68°F and 65% relative humidity), a spread rate of between 150 and 250 grams per square meter to each face of a joint is sufficient. The joint defect called “drying out” is influenced mainly by relative humidity, temperature, glue spread rate, wood type, and air circulation in the workshop. In conditions of high ambient temperature and low relative humidity, higher spread values may be necessary to limit drying out.

**Assembly Time:**

Assembly time is defined as the time elapsing between glue application and pressure application. It is divided into open time and closed assembly time.

Open assembly time should be kept as short as possible to avoid premature drying of the spread.

Under all circumstances the adhesive must still be tacky when the pressure is applied. Evidence of glue squeeze-out from the glue line upon pressure application will confirm that allowable assembly time was not exceeded.

**Assembly time in hours for various temperatures by resin type:**

Temperature (°C)	10	15	20	25	30	35
(°F)	50	59	68	77	86	95
500F	1.5	0.75	0.5			
500M		1.5	.01	0.75	0.5	
500S				1.0	0.75	0.5

**Clamping Pressures:**

Though the adhesive has limited gap-filling properties, it is important to bring surfaces into firm contact. It is essential that the mating surfaces of the joint establish contact before the adhesive gels.

Clamping pressure is dependent upon the wood species used and on the type of bonding operation. For laminated timber structures, the pressure should be 0.6-1.0 N/mm<sup>2</sup> for softwoods and 0.8-1.2 N/mm<sup>2</sup> for hardwoods.

**Clamping Times:**

These are the generally rated minimum fixturing times required to achieve full rated joint strengths.

**Required clamping times in hours for various temperatures by resin type:**

Temperature (°C)		10	15	20	25	30	40
		50	59	68	77	86	104
500F	24	7	5	2.5	1.5	0.5	
500M		15	8.5	6.5	3	1	
500S			17	9	6	2	

**Appearance:**

The resulting appearance of the cured glue line is visibly purple in color. This glue line is particularly noticeable on light colored wood species.

**Clean-Up:**

Mixing and spreading equipment must be cleaned after use and before the glue gels. Cured glue is insoluble and must be scraped off of tools. Un-cured glue can be removed effectively from tools and glue lines by wiping with warm water.

**Safety Precautions:**

Aerodux resins and hardeners are generally harmless to handle provided that certain precautions normally taken when handling chemicals are observed. Keep the uncured materials away from food. Cover any skin abrasions before working with these adhesives. Avoid breathing the vapor from either the resin or the hardener. These vapors are flammable. Keep away from open flames and assure containers are firmly sealed when not in use.

Skin and eye contact with uncured glue should be avoided due to possible reaction. Protective gloves and eye protection are recommended. Adequate ventilation of workshop should be assured.

**Use of Extenders:**

Wood flour or some mineral fillers (China clay, fine chalk, etc.) may be added to increase viscosity for gap filling or to reduce glue costs.

A “lightly-filled” mix would be comprised of 40 parts of filler to 100 parts resin and 100 parts hardener. This lightly filled mix will still comply with the requirements of BS-1203 (Type WBP).

A “heavily-filled” mix would be comprised of 200 parts of filler to 100 parts resin and 100 parts hardener. This will be highly viscous and may need to be adjusted with the addition of small amounts of water. Water additions should be kept to a minimum. This mix is suitable for bonding uneven-surfaced boards, such as mineral fiber reinforced boards, and where maximum strength and full weatherproof properties are not a primary requirement.

Note that the use of fillers is not allowed for approved systems for load bearing building components.