Protobind™ 1075

A renewable raw material for the Plywood Adhesives industry

Protobind™ 1075 is a high-purity natural polyphenolic material especially formulated for use as a partial replacement of phenol in phenol-formaldehyde (PF) resins for plywood. This product is now being industrially produced in India in dry powder form using state-of-the-art proprietary and patented Swiss technology. ALM India exclusively markets and promotes this product.

Protobind™ 1075 is a renewable product obtained by an extensively researched technology and is a step towards providing modern and economical raw materials to industry. By replacing petrochemical based raw materials with **Protobind™ 1075**, users will be protected from the wide price fluctuations and increases which characterize oil based products.

Typical properties of **Protobind™ 1075**	
% Solids	>95
% Ash	<3
pH (10% aqueous suspension)	~4
Solubility in water (acid or neutral)	Nil
Solubility in aqueous alkali	Very High

The use of **Protobind™ 1075** is 100% compatible with Indian industrial practices and results in panel performance that is comparable as per existing standards in Industry across various regions. Furthermore, using **Protobind™ 1075** also leads to favorable environmental impacts, such as reduction in usage of formaldehyde and of non-renewable Petroleum Derivatives.

Formulation of Protobind Protobind Protobind **Protobind™ 1075** in Plywood PF Resins

ALM India Pvt. Ltd. with the collaboration of the Indian Plywood Industries Research & Training Institute (IPIRTI), Bangalore has extensively worked on the development of PF resins based on **Protobind™ 1075**. Although various substitution levels are possible, 30% phenol replacement is recommended as a starting point that offers significant savings as compared to the use of phenol.

The formulations developed are entirely compatible with the equipment and operating practices available at typical Indian PF resin plants that cater to the plywood market.

Plywood PF resins based on **Protobind™ 1075** have properties that are comparable as per Standards in the Industry to those of standard PF plywood resins.

Poperties of Protobind™ 1075 based Plywood PF resins *(30% phenol substitution)*	
Solids Content	42-50%
Viscosity B-4 cup at 25±2°C (freshly prepared resin)	18-29 sec
pH	9-10
Get Time at 150±1°C	50-100 sec
Water Tolerance	8 or less to Infinity

Our team of technical experts is prepared to work with individual clients to customize formulations as required in order to achieve an optimum balance of performance and economics.

Manufacture and Performance of Plywood Panels made with PF resin based on **Protobind™ 1075**

Plywood PF resins based on **Protobind™ 1075** may be employed according to conventional procedures used for plywood manufacture. The product is compatible with traditional extenders such as coconut shell powder. The recommended glue spread rate is within the ranges of conventional Indian practice. Depending on the type of veneer used, open assembly time may be adjusted for optimum results. Pressing conditions are standard, according to panel construction and thickness.

Tests have confirmed that the panels obtained using a range of veneer species conform to the Indian Standard IS : 848 / IS : 303.

Typical Glue Formulation and Panel Manufacturing Parameters for use of **Protobind™ 1075** based plywood PF resins

Glue Formulation	
Protobind™ 1075 resin	100 parts by weight
Coconut Shell Powder	6 - 8 parts by weight
Veneer Moisture	6 - 8 %
Spread Rate	21 - 30 grams/ ft²
Open Assembly Time (OAT)	30 - 60 minutes
Pressing Temperature	145 ± 5°C
Specific Pressure*	12 - 16 Kg / cm²
Pressing Time*	7 - 24 minutes

** Depends upon panel thickness*

Strength Properties of 4-mm thick, 3-ply Construction Panels Made with Various Veneers using **Protobind™ 1075** based Plywood PF Resins

Veneers		Dry Strength	Wet Strength (8 hrs boiling), BWR Grade	Wet Strength (72 hrs boiling), BWP Grade
		Failing Load, kg		
Vellapine	Average	176	112	109
	Minimum Individual	145	106	102
Poplar	Average	157	119	113
	Minimum Individual	134	108	100
Silver Oak	Average	159	119	118
	Minimum Individual	130	100	100
Eucalyptus	Average	161	156	138
	Minimum Individual	150	130	125
Indian Standard	Average	135	100	100
IS: 848 / IS : 303	Minimum Individual	110	80	80

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