(pMDI) Polymer resin

pMDI, is an acronym of *polymeric diphenyl methane diisocyanate* and is an unconventional adhesive when compared to *Urea-Formaldehyde* (UF) resins, *Melamine-Urea-Formaldehyde* (MUF) resins, and *Phenol-Formaldehyde* (PF) resins. It is not an aqueous solution, it is free of acidic (as in the case of UF) and alkaline (in the case of PF) catalytic salts. pMDI is free of formaldehyde.

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pMDI is capable of forming a chemical and mechanical bond contributing to the high internal bond property.

Lignor (pMDI) Polymer resin

The Manufacturing of pMDI

Like phenol, pMDI is derived from crude oil. pMDI's principal feedstock is benzene. pMDI is a liquid polymer; it is not carried by a solvent, water or otherwise. Yet, polymeric pMDI is stable when compared to the pre-condensate forms of UF and PF: their shelf lives are measured in days, pMDI's in months.

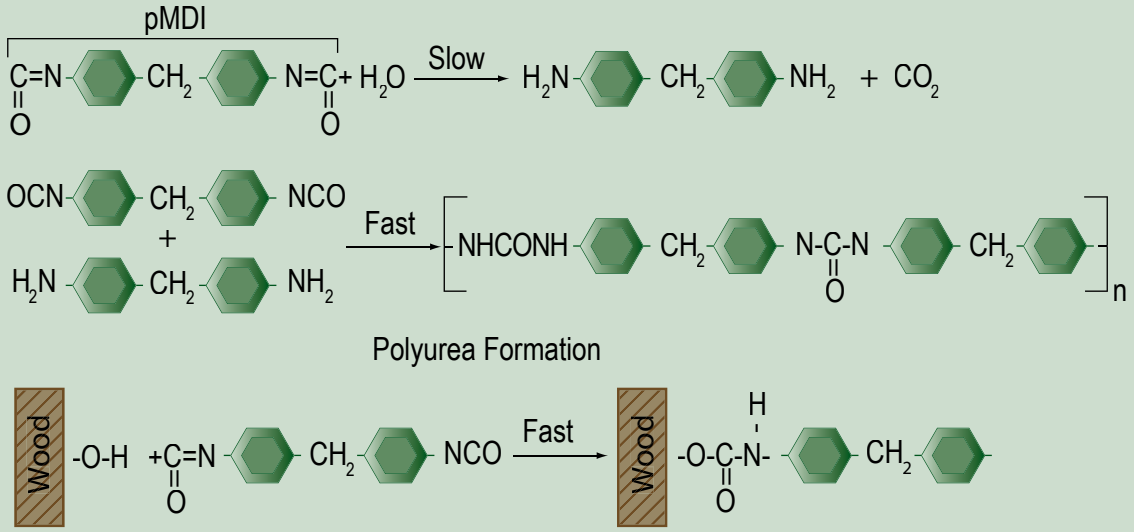
Curing of pMDI

In pMDI's propensity for water lies the clue for its curing. pMDI reacts with active hydrogen atoms. Wood surfaces are covered with -OH groups with active hydrogens. Ligno-cellulosic materials such as wood always have moisture adsorbed to surfaces; water has active hydrogens. Therefore, once it is sprayed, pMDI's curing begins. Its shelf life is then measured in minutes. Curing is accelerated and completed during hot pressing.

pMDI's curing consists of two reactions occurring simultaneously but at different speeds and initiated by its NCO-groups. Beginning rather slowly, pMDI forms with water the so-called polyurea. In a fast reaction, pMDI forms with the hydroxyl groups of wood the urethane bonds–a true chemical bond (the "double lock" effect).

At equal application rates, pMDI's bonding is superior to that of UF, MUF, and PF in a dry environment and vastly superior (even relative to PF) in a water soaked environment. pMDI contains no formaldehyde with no formaldehyde emission.

Reactions Occurring when Bonding Wood with pMDI



Reaction with Cellulosic Hydroxyls

pMDI is not thermoplastic, it will not reverse the thermoset achieved during the curing process in the press, unlike some other bonding resins that are thermoplastic and are reversible due to heat, thus losing their bond. The resin is also unaffected by UV light and water.

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