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**The Thesis Submitted for the Degree of Master of Science
(wood Composite products)**

**Synthetic resin Tannin-Lignin-Phenol-Resorcinol-
Formaldehyde (TLPRF) and its mechanical properties us-
ing three Beech, Abies and Poplar**

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Abstract

Adhesives based on Resorcinol, due to their high costs are not used for plywood production, but are used as the montage adhesives in the solid wood products that should be have high resistance to water and air (atmospheric agents), such as layer beams and I shape joints and metals. In this research the Tannin Lignin Phenol Resorcinol formaldehyde resin shape (TLPRF) was synthesized in the laboratory of university of Zabol, with different ratios in the four levels of Tannin and Lignin to Resorcinol and phenol and formaldehyde (T:L:P:R:F) (39.371:39.371:8.923:8.923:3.412) and (44.055 :44.055 :4.953:4.953: 1.985) and (36.767:36.767:11.109:11.109:4.248) and (45.513 :45.513 :3.858 :3.858 :1.259), that except the 24 hours resistance in cold water, have been the resistance within the standard range. After the synthesized the Tannin Lignin Phenol Resorcinol formaldehyde resin (TLPRF) its pH and concentration were measured. Two levels of Paraformaldehyde 20% and 10% was added to it. surface at 25 × 25 mm of two pieces at 115 × 25 × 3 mm (BS 1204 Part1) from three kinds of solid wood, *Fagus*, *Populus alba* and *Abies* (each of separately) with the amount of 350 gr per square meter were connected together. Then the shear strength of the samples in dry conditions were measured, after 24 hours immersion in cold water and after 6 hours immersion in boiling water. The obtained results showed that maximum shear strength in dry state, 24 hours immersion in cold water and after 6 hours immersion in boiling water is for type 1 adhesive with ratio of (39.371:39.371:8.923:8.923:3.412) and *Abies* wood species and (20%) accelerator and minimum shear strength related to type 4 adhesive with ratio of (45.513:45.513:3.858:3.858:1.259) and *Fagus* wood species and 10% accelerator. In general the maximum shear strength of samples in all species in dry conditions and minimum resistance in 24 hours immersion in cold water conditions were obtained. Also in all three case, the shear strength (dry, after 24 hours immersion in cold water and after 6 hours immersion in boiling water) increased with increase the ratio of formaldehyde in resin. According to observations can be said that the best result is for adhesive with ratio at (39.371:39.371:8.923:8.923:3.412) and *Abies* wood species and 20% accelerator.

Key words: Phenol Resorcinol formaldehyde synthesise, Tannin, Lignin, Mechanical properties of wood.