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

**Synthesis and determination character-
izations of Phenol Resorcinol Formal-
dehyde resin (PRF)**

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Abstract

In this study for the synthesis of phenol-resorcinol formaldehyde resin (PRF), phenol, resorcinol and formaldehyde were used. This resin was synthesized in three molar ratios (P: R: F), (1: 0.57: 1), (1: 0.57: 1.5), (1: 0.57: 2). Species used in this experiment were Iranian beech, spruce and yew to measure shear strength. Samples were cut with dimensions of $3 \times 25 \times 115$ mm. They were placed in the open air for a month until the moisture content reaches the humidity. For shear strength test on a flat surface of 25×25 mm of prepared wood samples, 120-150 grams per square meter synthetic adhesive was applied and glued the two pieces together. The shear strength test of the samples was taken in dry conditions, cold water immersion for 24 hours and immersion in boiling water for 6 hours measured. The results show that in dry condition, the highest shear strength belongs to the adhesive with the molar ratio of (P: R: F), (1: 0.57: 2) in dicer wood and the lowest belongs to the adhesive with the molar ratio of (P: R: F), (1: 0.57: 1) in poplar wood; in immersion conditions, the highest shear strength belongs to the adhesive with the molar ratio of (P: R: F), (1: 0.57: 2) in beech wood and the lowest belongs to the adhesive with the molar ratio of (P: R: F), (1: 0.57: 1) in dicer wood. In general, the maximum shear strength of specimens of all species was in dry conditions and the least resistance was in the condition of immersion in cold water for 24 hours. In all three cases (dry condition, 24 hour immersion in cold water, 6 hour immersion in boiling water) the shear strength increased with the increase of formaldehyde resins. According to the observations, we can say that the best adhesive is the one with molar ratio of (P: R: F), (1: 0.57: 2) and the best kind of wood is beech.

Key words: Resorcinol, Phenol, shear strength, Formaldehyde, Resin, boiling water