

TECHNICAL NOTE NUMBER F-2

FOREST PRODUCTS LABORATORY · U. S. FOREST SERVICE · MADISON, WISCONSIN

STRENGTH OF COMMERCIAL LIQUID GLUES

Most of the commercial liquid glues are manufactured from the skins, heads, and swimming bladders of fish. Others are made by special treatment of the glue extracted from the hides, skins and bones of cattle; some for special uses are prepared from starch, natural gums, or casein.

At the Forest Products Laboratory tests have been made on a number of liquid glues, which were found to differ very widely in strength. Some of them were so weak as to be entirely unsuitable for woodworking purposes, while others compare favorably in strength with the "hot" glues. The glues tested varied from one which exerted a binding force of less than 50 lbs. per sq. in. to one with an adhesive strength 60 times as great, giving a shearing strength of more than 3,000 lbs. per sq. in.

Liquid glues may be tested by gluing together pairs of specially selected hard maple blocks, placing them in a testing machine, and measuring the force required to shear them apart. About 300 specimens, representing 26 different glues, have been tested in this way at the Laboratory. According to the data thus obtained, a high grade liquid glue should have an average shearing strength of not less than 1,700 or 1,800 lbs. per sq. in.

In addition to uniformly high adhesive strength, certain other characteristics are desired in a liquid glue. When spread upon wood surfaces, it should "set" and dry rapidly. In its container, it should remain fluid and workable at all ordinary temperatures. It

should be elastic and shock-resistant. It should not be unusually susceptible to the action of high temperatures, high humidity, molds and bacteria.

The study gave evidence that the strength of liquid glue, like that of "hot" glue depends largely upon its "body" or thickness, or, strictly speaking, upon its viscosity. Of 11 liquid glues examined, the thickest or most viscous glues showed the greatest adhesive strength.