

TECHNICAL NOTES

FOREST PRODUCTS LABORATORY

U. S. FOREST SERVICE

MADISON, WISCONSIN

No. D-2

HOW TO DISTINGUISH DOUGLAS FIR FROM SITKA SPRUCE LUMBER

Douglas fir and Sitka spruce are frequently put to the same uses, particularly in the building of airplanes, but they do not have exactly the same properties. This fact makes it desirable to have a ready means of identifying the lumber of these species. The use of the following key prepared by the Forest Products Laboratory should help in telling the two woods apart:

General Characteristics.--Douglas fir is darker in color than Sitka spruce, and has more pronounced annual rings. Of the two, Douglas fir is decidedly the more resinous.

Color.--The color of Douglas fir, as seen on a freshly cut longitudinal surface, is orange-red to red; that of Sitka spruce is pale pinkish brown. The color varies in both species, however, so that the darker spruce is about the same as the lighter fir. There is a marked contrast in color between the heartwood and sapwood in Douglas fir; in Sitka spruce the difference is less pronounced, both being quite light in color. Douglas fir is not so lustrous as Sitka spruce which has a very noticeable "silky sheen".

Annual Rings.--In both species each annual ring is made up of a light, soft band or layer, known as springwood, and a dark, dense band known as summerwood, the summerwood being on the side toward the bark. In Douglas fir the bands of summerwood are usually very conspicuous and clearly defined from the springwood, but in Sitka spruce the springwood merges gradually into summerwood.

Resin.--Douglas fir is more resinous than spruce and often shows abundant exudations on cuts made before the lumber was seasoned. Such exudations of resin are scarce in spruce.

Tangential Surface.--Tangentially split surfaces (surfaces made by splitting along the rings) of Sitka spruce usually have numerous slight indentations giving it a "pocked" or dimpled appearance never found in Douglas fir. This characteristic is more pronounced in spruce with narrow annual rings and may be missing entirely in wide-ringed material, especially that near the center of the tree. Therefore, this observation should be made where the rings are narrowest. Occasionally the eastern spruces also show this uneven tangential surface to a slight extent. Some trees of western yellow pine also develop a "pocked" appearance of the wood, but the pine can be distinguished by the larger and more numerous resin ducts.

Bark.--Pieces of bark, if found on the lumber, afford a reliable means of distinguishing between Douglas fir and Sitka spruce. Douglas fir has a thick bark with characteristic whitish layers. Spruce has a thin bark without whitish layers.

Cell Walls.--With the aid of a compound microscope, Douglas fir can easily be distinguished from Sitka spruce. Douglas fir has spiral thickenings on the inside of the cells similar to the thread in a nut, but the cell walls of spruce are without such spirals.