

# Softwood identification criteria:

First steps • by George I. Mantanis FIAWS, PhD







**Hint:** In the identification process of a softwood species, it is suggested to follow specific **steps** in order to make it easier.

InsideWood: <a href="https://insidewood.lib.ncsu.edu/menu/type/MS?1">https://insidewood.lib.ncsu.edu/menu/type/MS?1</a>

**Geographical origin**: If you know for sure the exact origin of the specimen, please add the right criterion; e.g., if it originates from the central or north Europe, add: <u>2</u>

In most of the cases, this is <u>not</u> possible; thus, leave it as blank.

	GEOGRAPHICAL LOCATION	
1	Europe and temperate Asia	· ·
2	Europe, excluding Mediterranean	Present v
3	Mediterranean including Northern Africa and Middle East	· ·
4	Temperate Asia (China, Japan, Russia)	
5	Central South Asia	
6	India, Pakistan, Sri Lanka	
7	Myanmar	<u> </u>
8	Southeast Asia and Pacific	
9	Thailand, Laos, Vietnam, Cambodia (Indochina)	
10	) Indomalesia	
1	Pacific Islands	
1:	Australia and New Zealand	
1:	3 Australia	
14	New Zealand	
1	Tropical mainland Africa and adjacent islands	
10	Tropical Africa	
1	7 Madagascar & Mauritius, Réunion & Comores	
18	Southern Africa (south of the Tropic of Capricorn)	
19	North America, north of Mexico	<u> </u>
20	Neotropics and temperate Brazil	

**Air-dry density**: This is important. Cut carefully a small specimen having normal geometric dimensions. Climatize the wood at normal conditions (20°C/65% RH) until it obtains the air-dry state. Then, estimate its air-dry volume, and its mass.

For instance, if the specimen is *medium* in density, add: <u>38</u>

Density is the ratio of mass to volume:

$$\rho = \frac{m}{V}$$

 $\rho$  – Density (kg m<sup>-3</sup>)

m - Mass (kg)

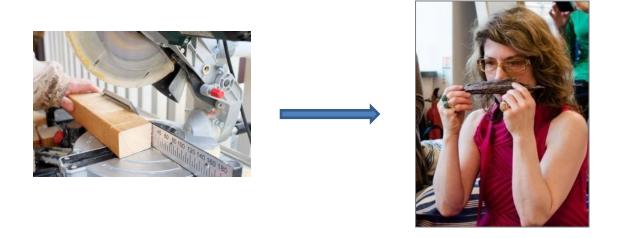
V – Volume ( $m^3$ )



	AVERAGE AIR-DRY DENSITY		
37	Less than 0.48 g/cm3		~
38	0.48-0.60 g/cm3	Present	<b>~</b>
39	Above 0.60 g/cm3		~

**Odor**: This needs **specific** experience. A freshly cut specimen may or may not smell. Try to smell if there is any **distinct** odor. Most of the softwood (coniferous) species do smell.

If the wood specimen has distinct odour, add 35p. If not, add 35a.

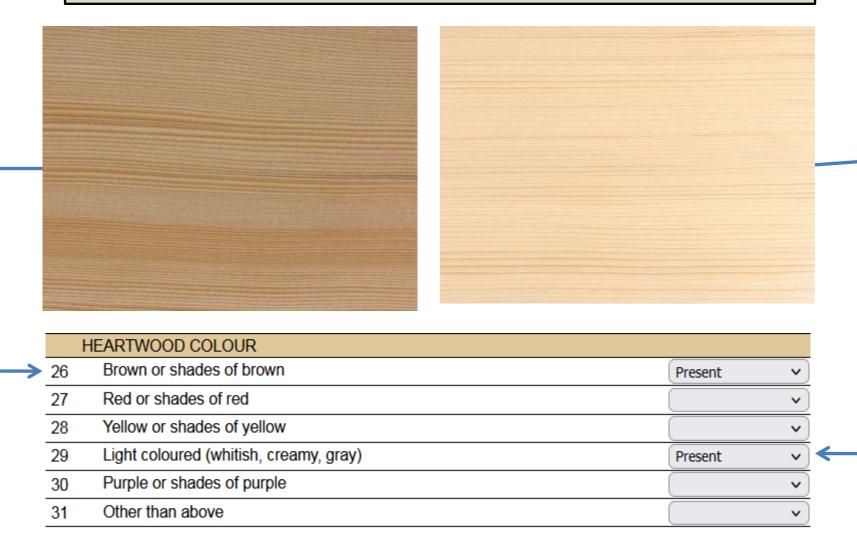


#### **ODOUR**

35

**Color of heartwood**: In this case, you should add the color(s) of the specimen heartwood. In rare cases, you may add two colors.

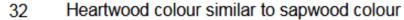
Examples (below): If the wood specimen is *brownish*, add: <u>26</u> In case that the specimen is *creamy/whitish*, please add: <u>29</u>

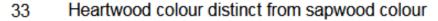


**Heartwood vs. Sapwood Color**: This is easy to distinguish. Check the color difference between the heartwood and the sapwood, if any. In most of the cases, this feature is not possible to evaluate.

Examples (below): if there is a clear color difference, add: 33





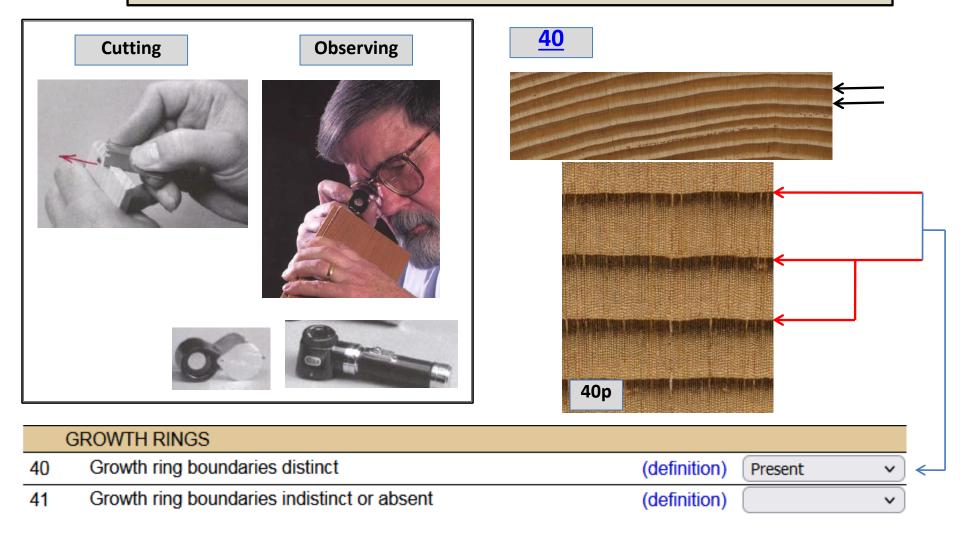






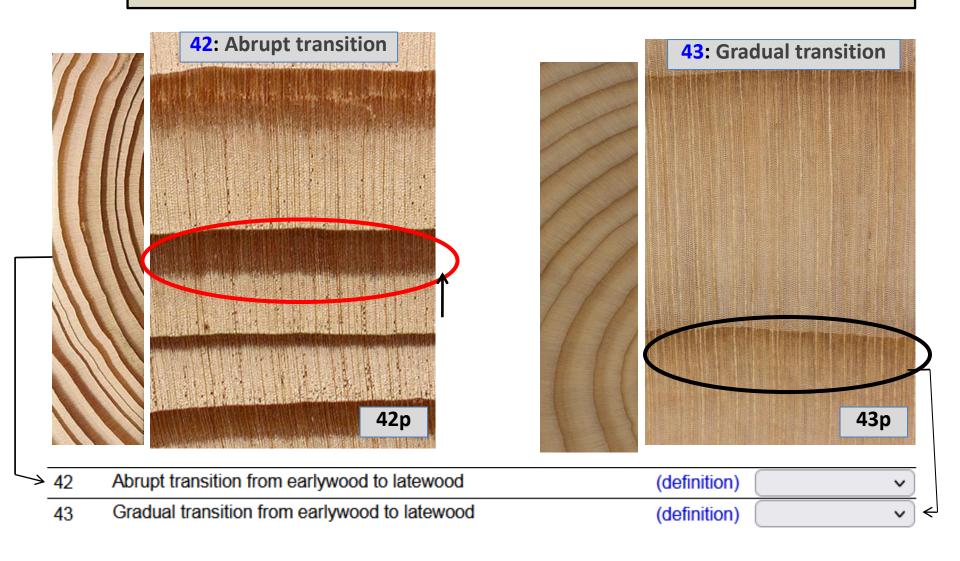
**Growth Rings**: Cut carefully the specimen in the cross-section by a razor blade or knife. Then, use a hand lens for some observations.

If the specimen appears to have distinct rings, add: 40

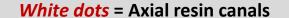


**Earlywood/latewood transition**: This means if it goes gradually or abruptly from the springwood area to summerwood area.

In the left-handed sample, the transition is abrupt (add 42p).

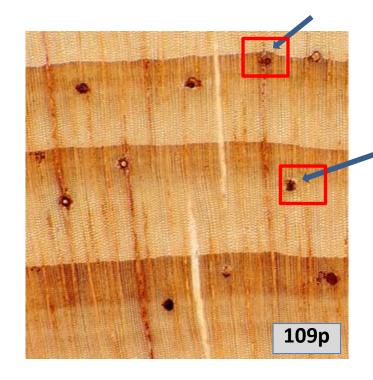


**Resin canals**: This is easy to distinguish in the cross-section. Typically, the conifer species *Pinus*, *Picea*, *Larix*, *Pseudotsuga* have axial resin canals. If the specimen has resin canals, add <u>109p</u>









INTERCELLULAR CANALS

109 Axial canals

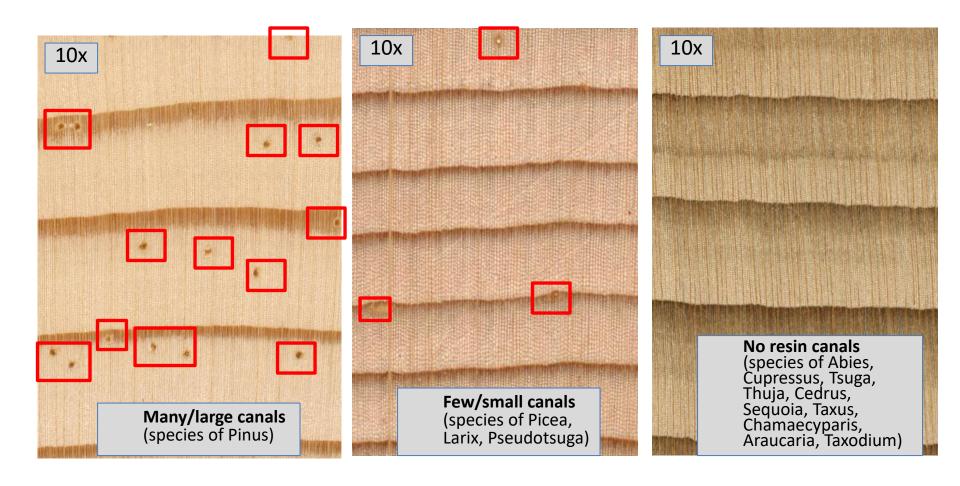
(definition)

Present



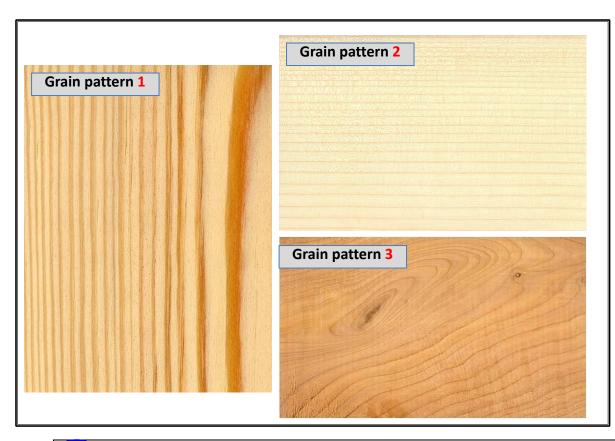
8a

Number & size of resin canals: Keep this in mind. The conifer woods of true *Pinus* species have <u>larger</u> and <u>numerous</u> resin canals. While, the species of *Picea*, *Larix* and *Pseudotsuga* have fewer and smaller resin canals. Thus, this fact separates softwoods in 3 groups.



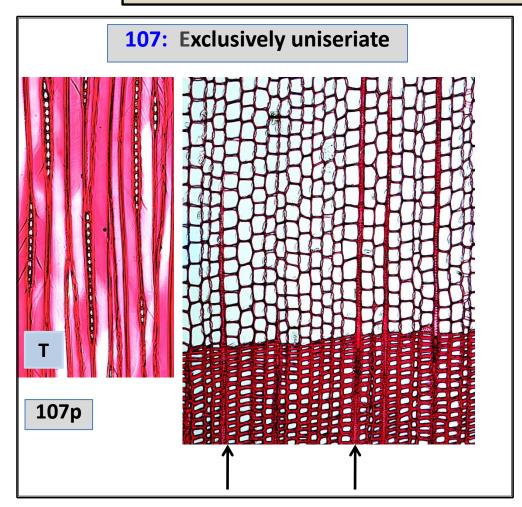
**Grain pattern • Streaks**: This needs **specific** experience. Typically, all softwoods have their own grain pattern. Check carefully the sample and write down your opinion about <u>the type</u> of the grain pattern.

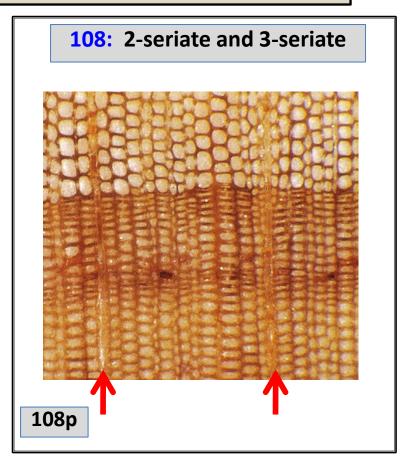
Examine carefully and see if there are any **streaks** on the surface. If the specimen appears to have *streaks* in the heartwood, add: <u>34</u>





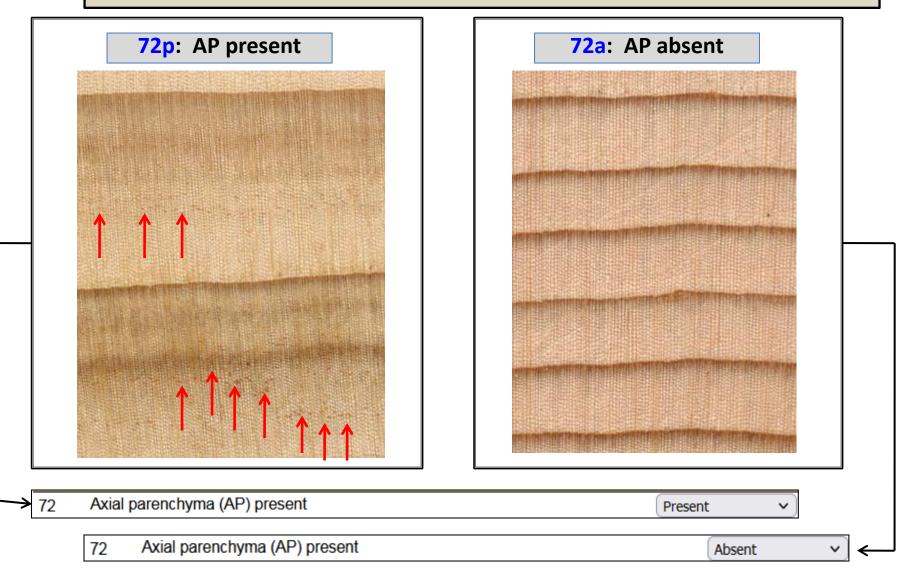
Ray width: This feature is related with the average number of ray cells that constitute the rays. In softwoods, 2 categories exist.





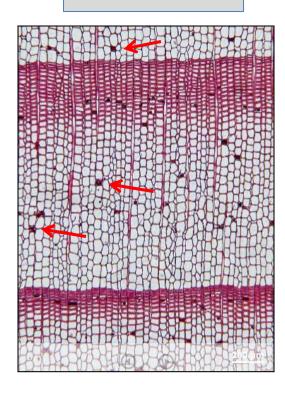
Ray width (applies to rays without canals)		
107	Rays exclusively uniseriate	
108	Rays 2-3 -seriate in part	

**Axial Parenchyma**: Parenchyma (see: *black dots*) are oriented along the wood length (referred to as *longitudinal* or *axial* parenchyma). In softwoods, these cells have almost the same diameter as the tracheids.

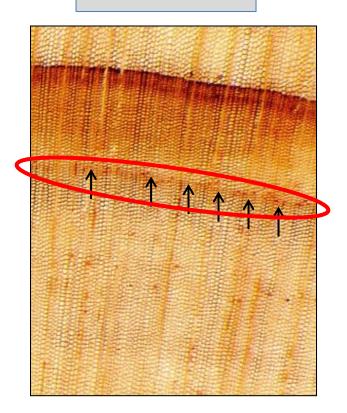


# **Types** of Axial Parenchyma

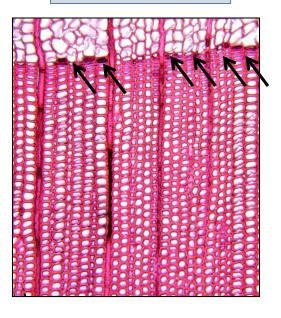
73: Diffuse



**74**: Zonate

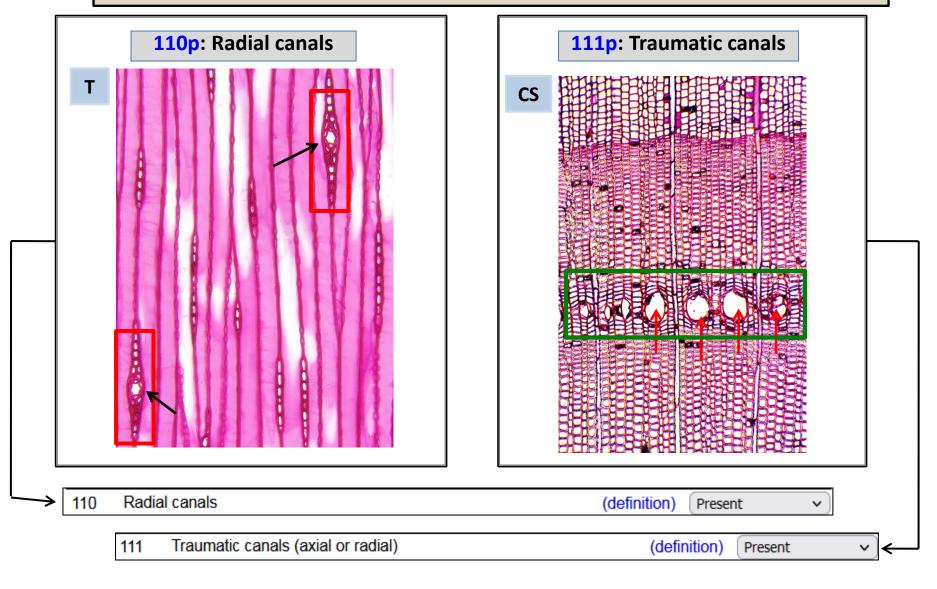


75: Marginal



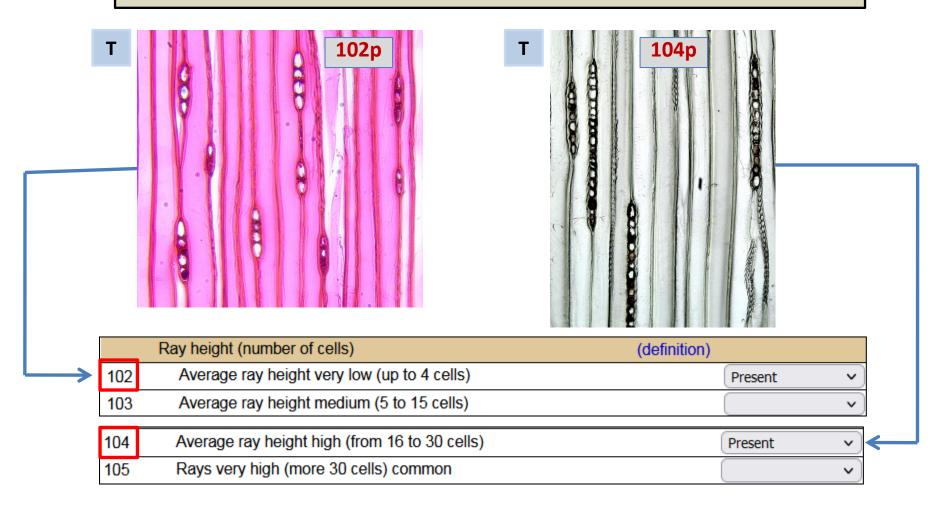
	Arrangement of axial parenchyma		
73	Diffuse axial parenchyma	(definition)	<
74	Tangentially zonate axial parenchyma	(definition)	
75	Marginal axial parenchyma	(definition)	( v)

Radial canals • Traumatic canals: Radial canals may exist exclusively within the rays (fusiform rays). Rarely, traumatic canals are present in irregular outlines in several species, even in Abies, Cedrus, Sequoia spp.



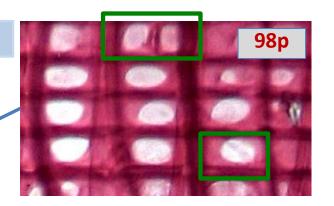
**Ray Height**: In this feature, at the *tangential* section (T), the mean total number of the cells that constitute each ray, is estimated.

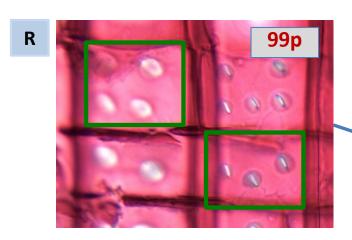
Examples (below): If the species has ca. 1-4 cells, then add: <u>102</u> In case that the wood species has a mean no. 16-30 cells, add: <u>104</u>



**Number of pits per cross-field**: In this feature, at the *radial* section, the total number of pits per each cross-field, is estimated.

Examples (below): If the wood species has 3-5 pits, add: <u>99</u> In case that the wood species has approx. 1-3 pits, then add: <u>98</u>



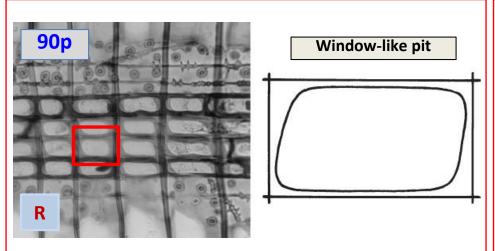


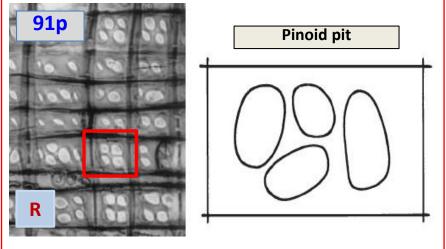
	Number of pits per cross-field (earlywood only)		
97	(large window-like) 1-2 pits per cross-field		<b>v</b>
98	1-3 pits per cross-field	Present	<b>v</b> )
99	3-5 pits per cross-field	Present	<b>v</b> )
100	6 or more pits per cross-field		<b>~</b> )

**16a** 

**Cross-field pitting:** In this <u>important</u> feature, at the *radial* section, the specific **type** of pits in the cross-field, is observed.

Examples (below): If the species has *window-like* pits, add: <u>90</u> In case that the wood species has *pinoid* pits, then add: <u>91</u>



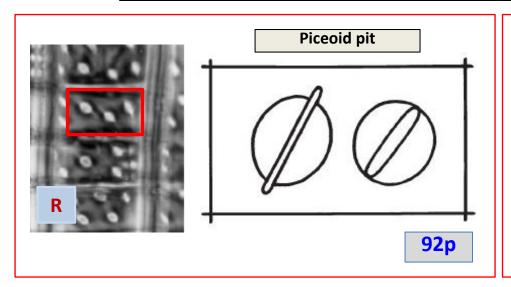


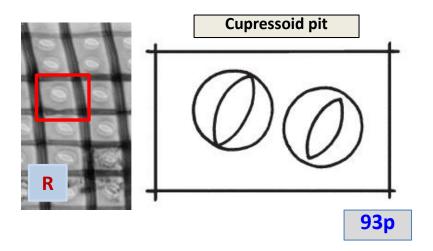
	CROSS-FIELD PITTING (earlywood only)	(definition)	
90	Window-llike (fenestriform)	(definition)	~
91	Pinoid	(definition)	<b>v</b>
92	Piceoid	(definition)	<b>v</b>
93	Cupressoid	(definition)	<b>v</b>
94	Taxodioid	(definition)	<b>v</b>
95	Araucarioid	(definition)	<b>v</b> )

16b

**Cross-field pitting**: In this <u>important</u> feature, at the *radial* section, the specific **type** of pits in the cross-field, is observed.

Examples (below): If the species has *piceoid* pits, add: <u>92</u> In case that the wood species has *cupressoid* pits, then add: <u>93</u>



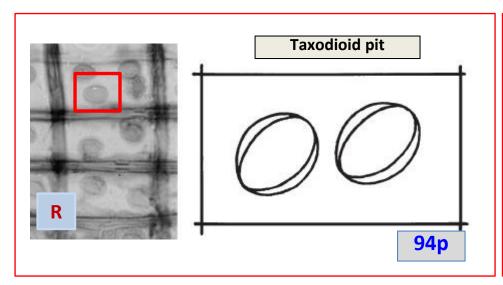


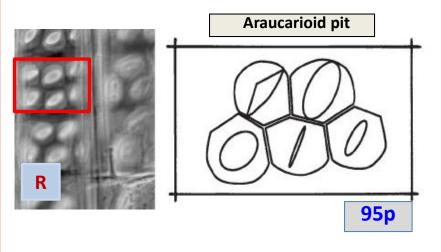
	CROSS-FIELD PITTING (earlywood only)	(definition)	
90	Window-Ilike (fenestriform)	(definition)	~)
91	Pinoid	(definition)	~
92	Piceoid	(definition)	~)
93	Cupressoid	(definition)	~
94	Taxodioid	(definition)	~
95	Araucarioid	(definition)	<b>v</b> )

**16c** 

**Cross-field pitting:** In this <u>important</u> feature, at the *radial* section, the specific **type** of pits in the cross-field, is observed.

Examples (below): If the species has *taxodioid* pits, add: <u>94</u> In case that the wood species has *araucarioid* pits, then add: <u>95</u>





	CROSS-FIELD PITTING (earlywood only)	(definition)	
90	Window-Ilike (fenestriform)	(definition)	~)
91	Pinoid	(definition)	~
92	Piceoid	(definition)	~)
93	Cupressoid	(definition)	~
94	Taxodioid	(definition)	~
95	Araucarioid	(definition)	<b>v</b> )

## **Acknowledgements**

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https://www.delta-intkey.com/wood/en/index.htm

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- Dr. Elisabeth Wheeler NCSA link
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