Timber *cuts* explained: plain, quarter, rift and through-and-through

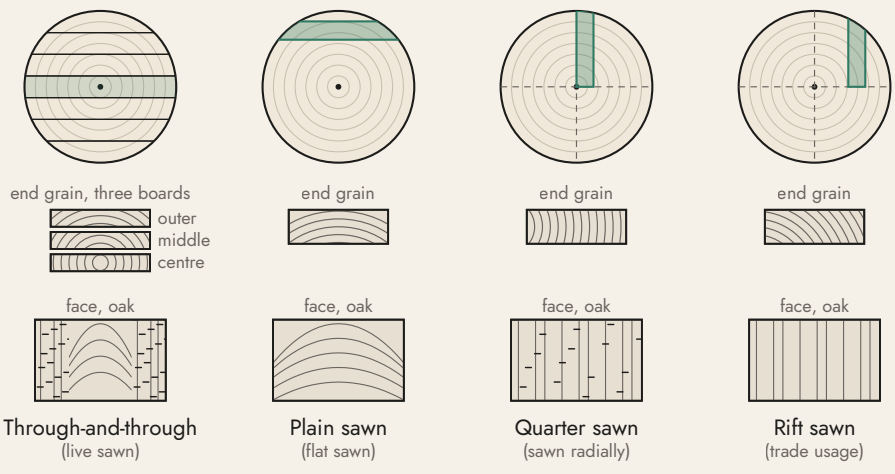
Plain, quarter, rift and through-and-through sawn timber compared: ring angles, grain, movement, board width and wording that fixes the cut.

AT A GLANCE

Cut and ring angle to the wide face	Look in oak	Movement	Board width and cost	Say in the specification
Through-and-through (live sawn) Rings at all angles, about 0 to 90°.	Mixed: cathedral outside, straighter near the centre.	Mixed: use the tangential figure.	As wide as the log allows. Sapwood and pith can come in.	Through-and-through, with sorting and sapwood limits.
Plain sawn (flat sawn) Rings at 0 to 45°.	Cathedral figure. Round knots.	Most across the width, least in thickness.	The default. Costs less, being easier to obtain.	Plain sawn.
Quarter sawn Rings at 45 to 90°.	Straight grain. Ray fleck in oak. Spike knots.	About half the width movement. Less cupping.	Narrower boards, sapwood at the edges. Costs more.	Quarter sawn; ray fleck wanted or not.
Rift sawn (trade usage) Rings at about 30 to 60°.	Straight grain, little or no fleck.	Between the two. Not in the sources read.	Not in the sources read: ask the partner.	Rift sawn, with the angle range or a sample.

Angles are from the Wood Handbook (2021), which calls 30 to 60° bastard sawn. The trade does not agree where one cut ends and the next begins, so give an angle range or a sample. No prices are given.

THE FOUR CUTS DRAWN



Schematic: rings, flecks and figure are drawn, not measured.

MOVEMENT ACROSS THE WIDTH AND THROUGH THE THICKNESS

For American white oak and a four-point change in moisture content (Wood Handbook Table 13-5, our arithmetic): a 150 mm wide board moves about 2.3 mm if plain sawn and 1.2 mm if quarter sawn; a 25 mm thick board about 0.2 mm and 0.4 mm. A 1,000 mm wide top of plain sawn boards could move up to about 15 mm, and of quarter sawn boards about 8 mm. European oak was not in the tables read.

SPECIFICATION WORDING

CUT: QUARTER SAWN

Species [European oak (Quercus robur or Q. petraea)]. Cut [quarter sawn]: growth rings at [45 to 90] degrees to the wide face on every visible face, ray fleck [acceptable / not wanted]. Match control sample [S-01]; the sample governs if it and the angle disagree.

CUT: RIFT SAWN

Cut [rift sawn], defined as growth rings at [30 to 60] degrees to the wide face, straight grain, ray fleck [limited]. Control sample [S-01], signed and dated, held by [party]. Visible faces of this cut only.

CUT: THROUGH-AND-THROUGH

Cut [through-and-through (live sawn)]. Boards [kept in log order / sorted for colour]; mixed grain accepted. Sapwood [not permitted on visible faces]; pith [not permitted]. Match control sample [S-01].

ALLOWING FOR MOVEMENT

Solid timber [top] [1,000] mm wide, [plain / quarter / mixed] sawn. Allow [ ] mm movement across the width for a [4]-point change in moisture content, fixed so that it can move. Moisture content at dispatch [ ]%, [heated] interior, by recorded reading.

TERMS USED

Plain sawn
Boards cut tangentially to the rings, which meet the wide face at 0 to 45 degrees. Also flat sawn.

Quarter sawn
Boards cut radially from the pith, with the rings at 45 to 90 degrees to the wide face.

Rift sawn
Rings between plain and quarter sawn, commonly 30 to 60 degrees: straight grain, little fleck. Definitions vary.

Through-and-through
A log sawn straight through into parallel boards, giving every ring angle in one stack. Also live sawn.

STANDARDS AND SOURCES

- USDA Forest Products Laboratory, Wood Handbook, FPL-GTR-282 (2021): Ch. 3 pp. 3-15 to 3-16 and Table 3-1; Ch. 4 Tables 4-2, 4-3; Ch. 13 Eq. 13-3, Table 13-5; Ch. 6. Read 5 Nov 2026.
- Architectural Woodwork Standards, 1st edition (2009), Section 3 Lumber and Section 4 Sheet Products: Section 3, 1.2.1 to 1.2.10; Section 4, 1.2.18. US standard.
- Wikipedia: Quarter sawing: through-and-through sawing and the terminology conflict.
- BS EN 975-1:2009 Sawn timber. Appearance grading of hardwoods. Oak and beech: BSI listing only; not read.
- Make Bespoke Studio journal: Wood species for bespoke furniture: species we work in.

Full guide: https://makebespoke.com/trade/technical/timber-cuts-explained. Make Bespoke Studio coordinates manufacture through its partner workshops. Figures are guidance only and your specification governs; some may be superseded, so contact the studio to verify.