
Cherry (Prunus Serotina) Solid Wood – Technical Material Specification for Machining & Fabrication

1.0 Material Overview & Common Uses

Cherry (*Prunus serotina*) is a premium North American hardwood prized for its rich, warm colour that deepens with age, fine grain, and excellent workability. It is classified as a medium-density hardwood with moderate hardness and good dimensional stability when properly dried.

Common industrial applications include high-end furniture, cabinetry, architectural millwork, musical instruments, turned objects, and decorative veneers. Cherry is also used for solid-wood paneling, mouldings, and custom joinery where aesthetic appeal and machinability are critical.

2.0 Core Technical Properties & Sizing

- Average dried density: 560–640 kg/m³ (35–40 lb/ft³) at 12% moisture content.
- Janka hardness: 950 lbf (4,230 N) – moderate hardness, suitable for both hand and machine tools.
- Modulus of rupture (MOR): 85 MPa (12,300 psi) – good bending strength for structural applications.
- Modulus of elasticity (MOE): 10.3 GPa (1.49×10^6 psi) – moderate stiffness.
- Crushing strength parallel to grain: 49 MPa (7,100 psi).
- Radial shrinkage: 3.7% (green to oven-dry); tangential shrinkage: 7.1% – moderate movement; dimensionally stable after kiln-drying.
- Standard rough lumber thicknesses: 4/4, 5/4, 6/4, 8/4, 12/4 (nominal inches). Surfaced dimensions (S2S) typically 13/16 in, 1-1/16 in, 1-5/16 in, etc.
- Standard widths: random (3–12 in) or specified; lengths: random (4–16 ft) or specified. Tolerances: $\pm 1/16$ in on thickness, $\pm 1/4$ in on width, $\pm 1/2$ in on length for surfaced stock.
- Moisture content specification: 6–8% for interior applications; 8–10% for exterior millwork (kiln-dried).

3.0 Processing, Machinability & Application

Cherry is renowned for its excellent machinability with both hand and power tools. It cuts cleanly, sands to a smooth finish, and holds detail well. The wood has low blunting effect on cutting edges, but sharp tooling is essential to avoid tear-out on figured grain.

- Sawing: Use carbide-tipped blades with 40–60 teeth for crosscuts and 24–30 teeth for ripping. Feed rate: 10–15 m/min for ripping, 5–8 m/min for crosscutting. Maintain blade speed of 3,000–4,000 RPM.
- Planing & Moulding: Use sharp knives with a 30–40° cutting angle. Depth of cut: 0.5–1.5 mm per pass. Feed rate: 6–10 m/min. Avoid excessive pressure to prevent burnishing.
- Routing & Shaping: Use carbide-tipped bits with a 1/2 in shank. Spindle speed: 12,000–18,000 RPM. Feed rate: 3–6 m/min. Climb cutting recommended for clean edges on end grain.
- Drilling: Use brad-point or Forstner bits for clean holes. Speed: 1,500–2,500 RPM. Feed pressure moderate; back out frequently to clear chips.

- Sanding: Start with 80–100 grit, progress to 180–220 grit for final finish. Avoid over-sanding at high grits (above 220) as it can burnish the surface and reduce stain absorption.
- Gluing: Excellent glue bond with PVA (yellow glue) or polyurethane adhesives. Apply even pressure (100–150 psi) for 30–60 minutes clamp time. Avoid glue starvation on porous end grain.
- Finishing: Cherry darkens naturally with UV exposure. Use a sealer coat of shellac or sanding sealer before staining to prevent blotching. Oil-based varnishes, lacquers, and waterborne finishes adhere well.
- Steam bending: Good response; steam at 100°C for 1 hour per 25 mm thickness. Bend radius minimum 20:1 (thickness to radius).

4.0 Common Defects & Quality Control

- Reject if moisture content exceeds 10% for interior applications or varies more than $\pm 2\%$ within a single board.
- Reject if surface checks (cracks) exceed 1/8 in depth or 6 in length on any face.
- Reject if knots are loose, open, or exceed 1/2 in diameter in structural or visible areas.
- Reject if wane (bark edge) exceeds 1/4 in width on any edge or 1/8 in on face.
- Reject if bow (lengthwise curvature) exceeds 1/4 in over 8 ft length.
- Reject if crook (edgewise curvature) exceeds 1/8 in over 8 ft length.
- Reject if twist exceeds 1/4 in over 8 ft length.
- Reject if cup (face curvature) exceeds 1/16 in per 4 in width.
- Reject if surface pitting, insect damage, or decay is visible on any face.
- Reject if mineral streaks or stain exceed 10% of board surface area in clear-grade material.
- Acceptable tolerance for surfaced thickness: ± 0.010 in (0.25 mm) for S2S stock.
- Acceptable tolerance for width: $\pm 1/16$ in for ripped stock; $\pm 1/8$ in for random-width.

5.0 Storage, Handling & WHMIS Guidelines

- Store in a dry, well-ventilated area with relative humidity between 35–55% and temperature 15–25°C to maintain target moisture content.
- Stack lumber flat on stickers (3/4 in thick) spaced 24 in apart, with stickers aligned vertically to prevent warping.
- Allow air circulation around all sides of the stack. Do not store directly on concrete floors; use pallets or dunnage.
- Shelf life: Indefinite when stored under controlled conditions. Use FIFO (first-in, first-out) inventory rotation to avoid moisture regain or degradation.
- WHMIS Classification: Wood dust (CAS 7440-44-0) is classified as a hazardous substance under WHMIS 2015. Hardwood dust is a known human carcinogen (IARC Group 1).
- Mandatory PPE: Wear NIOSH-approved N95 or P100 respirator when sanding, sawing, or machining. Safety glasses with side shields, hearing protection (earplugs or earmuffs) for noise above 85 dBA, and cut-resistant gloves for handling rough lumber.
- Engineering controls: Use local exhaust ventilation (LEV) with dust collection rated for fine wood dust (minimum 1 micron filtration). Maintain air velocity at source of 20–30 m/s for capture.
- Prohibited: Do not use compressed air to clean surfaces; use HEPA vacuum or wet methods. Do not eat, drink, or smoke in work areas.
- First aid: In case of eye contact, flush with water for 15 minutes. For skin contact, wash with soap and water. If inhaled, move to fresh air. Seek medical attention if irritation persists.
- Spill/disposal: Collect wood dust and chips in sealed containers labeled as non-hazardous solid waste (unless contaminated). Dispose per local regulations.

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