
Soft Maple Solid Wood Machining – Technical Material Specification

1.0 Material Overview & Common Uses

Soft Maple refers to two closely related North American hardwood species: Red Maple (*Acer rubrum*) and Silver Maple (*Acer saccharinum*). Despite the name, it is a moderately hard, diffuse-porous hardwood with a Janka hardness rating of approximately 700–950 lbf, making it softer than Hard Maple (*Acer saccharum*) but still suitable for structural and decorative applications. It is widely available in Eastern Canada and the Northeastern United States.

Common industrial applications include furniture frames, cabinetry (painted or stained), millwork, mouldings, turned parts, kitchen utensils, toys, and musical instruments (e.g., drum shells and guitar necks). It is also used for crating, pallets, and light structural components where a balance of strength, weight, and cost is required.

2.0 Core Technical Properties & Sizing

- Average dried density: 0.55–0.63 g/cm³ (34–39 lb/ft³ at 12% MC)
- Janka hardness: 700–950 lbf (varies by species and growth rate)
- Modulus of rupture (MOR): 8,500–11,000 psi (58.6–75.8 MPa)
- Modulus of elasticity (MOE): 1.1–1.4 million psi (7.6–9.7 GPa)
- Crushing strength parallel to grain: 5,000–6,500 psi
- Tangential shrinkage (green to 12% MC): 4.5–6.0%
- Radial shrinkage (green to 12% MC): 2.5–3.5%
- Standard lumber thicknesses (S2S): 4/4 (1.00 in), 5/4 (1.25 in), 6/4 (1.50 in), 8/4 (2.00 in) – actual thickness after planing: 13/16 in, 1-1/16 in, 1-5/16 in, 1-13/16 in respectively
- Standard widths (random): 3 in to 12 in, with 4–8 in most common
- Standard lengths: 6 ft to 16 ft, random or specified
- Moisture content at delivery: 6–9% (kiln-dried) for interior use; 12–15% for exterior or crating
- Grade rules per NHLA: FAS, FAS-1F, Select, #1 Common, #2 Common, #3A Common, #3B Common

3.0 Processing, Machinability & Application

Soft Maple machines very well with both carbide and high-speed steel (HSS) tooling. It has low silica content, so tool wear is moderate. It planes, shapes, turns, and sands to a smooth finish. It holds screws and nails well without pre-drilling in most cases, though pre-drilling is recommended near edges to prevent splitting. It glues easily with PVA (yellow glue) or polyurethane adhesives.

- Recommended saw blade: 24–40 tooth ATB (alternate top bevel) carbide-tipped blade for ripping; 60–80 tooth for crosscutting
- Planer feed rate: 15–25 ft/min with sharp knives; snipe can occur if infeed/outfeed support is inadequate
- Router speed: 12,000–18,000 RPM; use 2-flute carbide bits for general profiling, 3-flute for smoother finish
- Turning: 1,000–2,500 RPM depending on diameter; use sharp gouges and scrapers; sand to 180–220 grit before finishing

- Sanding: Start at 80–100 grit, progress to 180–220 grit; avoid over-sanding as maple can burnish and resist stain
- Gluing: Apply even pressure for 30–60 minutes clamp time; full cure in 24 hours at 70°F (21°C)
- Fastening: Use #8 or #10 wood screws; pre-drill 1/16 in pilot hole for hard maple but not always required for soft maple
- Finishing: Accepts stains, paints, clear coats, and oils well; use a wood conditioner before staining to reduce blotchiness

4.0 Common Defects & Quality Control

- Reject if moisture content exceeds 10% for interior-grade lumber (unless specified otherwise)
- Reject if surface checks (cracks) exceed 1/16 in width or extend more than 1/4 of board thickness
- Reject if wane (bark edge) exceeds 1/3 of face width on any face for FAS grade
- Reject if bow exceeds 1/4 in over 8 ft length for surfaced lumber
- Reject if crook (edge warp) exceeds 1/8 in over 8 ft length for surfaced lumber
- Reject if cup exceeds 1/8 in over 4 in width for surfaced lumber
- Reject if twist exceeds 1/4 in over 8 ft length
- Reject if knots are loose, cracked, or exceed 1 in diameter for #1 Common grade
- Reject if mineral streaks or stain cover more than 25% of face area for FAS grade
- Reject if insect damage (pinholes, grub holes) exceeds 3 holes per board foot
- Reject if decay (rot) is present in any form
- Acceptable: small sound knots under 1/2 in, slight color variation, light mineral streaks in lower grades

5.0 Storage, Handling & WHMIS Guidelines

- Store lumber flat on stickers (1 in x 1 in) spaced 16–24 in apart to allow air circulation
- Maintain storage environment at 35–50% relative humidity and 60–80°F (15–27°C) to prevent dimensional change
- Keep lumber away from direct heat sources, concrete floors, and exterior walls to avoid moisture gradients
- Cover with breathable tarps or plastic sheeting if stored outdoors; never seal completely as condensation causes mold
- Shelf life: indefinite if stored properly; but moisture content should be verified before use if stored >6 months
- FIFO (First In, First Out) protocol: use oldest stock first to minimize moisture variation and degrade
- WHMIS 2015 classification: Wood dust (CAS 7440-44-0) is classified as a hazardous substance – carcinogenic (IARC Group 1) when inhaled as fine dust
- Mandatory PPE: Safety glasses or face shield during machining; N95 or P100 respirator when sanding or machining without dust collection; hearing protection if noise exceeds 85 dBA
- Recommended PPE: Cut-resistant gloves when handling rough lumber; anti-vibration gloves for prolonged routing/sanding
- Engineering controls: Use local exhaust ventilation (LEV) with dust collectors rated for fine wood dust (1 micron or less); maintain air velocity of 400 ft/min at capture point
- First aid: For eye contact, flush with water for 15 minutes; for skin contact, wash with soap and water; for inhalation, move to fresh air and seek medical attention if symptoms persist
- Spill procedure: Sweep or vacuum dust; do not use compressed air as it disperses dust into the air
- Disposal: Dispose of wood waste in accordance with local municipal regulations; untreated wood is generally non-hazardous solid waste

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