

Industrial Particleboard Core – Technical Material Specification

1.0 Material Overview & Common Uses

Industrial Particleboard Core is an engineered wood composite panel manufactured from wood chips, sawmill shavings, and resin binders (typically urea-formaldehyde) pressed under heat and pressure. This material is classified under ANSI A208.1 Grade M3 for interior applications requiring high density and screw-holding capacity.

- Primary applications include kitchen cabinet carcasses, countertop substrates, shelving, furniture core stock, and door cores.
- Commonly used as a substrate for high-pressure laminate (HPL), melamine, veneer, or paint finishes.
- Preferred in RTA (ready-to-assemble) furniture and commercial millwork due to dimensional stability and cost-effectiveness.

2.0 Core Technical Properties & Sizing

- Density: 640–720 kg/m³ (40–45 lb/ft³) for Grade M3.
- Moisture content: 5–9% (as measured by oven-dry method per ASTM D4442).
- Standard panel dimensions: 4 ft x 8 ft (1220 mm x 2440 mm); also available in 5 ft x 8 ft (1525 mm x 2440 mm) and cut-to-size.
- Thicknesses: 3/4 inch (18 mm), 5/8 inch (15 mm), 1/2 inch (12 mm), 3/8 inch (9 mm), and 1/4 inch (6 mm).
- Thickness tolerance: ±0.005 inches (0.13 mm) for sanded panels; ±0.010 inches (0.25 mm) for unsanded.
- Squareness tolerance: diagonal difference ≤ 0.0625 inches (1.6 mm) per 4 ft width.
- Internal bond strength (IB): ≥ 0.45 MPa (65 psi) per ANSI A208.1.
- Screw holding capacity (face): ≥ 800 N (180 lbf); (edge): ≥ 600 N (135 lbf).
- Modulus of rupture (MOR): ≥ 16.5 MPa (2400 psi) for Grade M3.
- Modulus of elasticity (MOE): ≥ 2400 MPa (350,000 psi).
- Formaldehyde emission: ≤ 0.11 ppm (CARB Phase 2 compliant) for interior use.

3.0 Processing, Machinability & Application

Industrial Particleboard Core machines well with carbide-tipped tooling due to its abrasive nature. It is suitable for sawing, routing, drilling, and edgebanding. The material has a tendency to dull tooling faster than solid wood, so tool life monitoring is critical.

- Sawing: Use a triple-chip grind (TCG) carbide saw blade with 60–80 teeth for clean cuts. Feed rate: 10–15 m/min for 18 mm thickness.
- Routing: Use compression spiral bits (up-cut/down-cut) to minimize chipping on both faces. Spindle speed: 16,000–20,000 RPM; feed rate: 5–8 m/min.
- Drilling: Use brad-point or dowel drills with carbide inserts. For screw pilot holes, drill diameter should be 75% of screw root diameter.

- Edgebanding: Apply PVC, ABS, or melamine edgebanding with hot-melt adhesive (EVA or PUR). Panel temperature should be $\geq 18^{\circ}\text{C}$ (65°F) for proper adhesion.
- Gluing: Use PVA (polyvinyl acetate) or PUR adhesives for assembly. Clamp pressure: 0.5–1.0 MPa (70–145 psi) for 30–60 minutes.
- Finishing: Seal edges and surfaces with a sanding sealer or primer before painting. Avoid water-based coatings directly on raw board without sealing.
- Fastening: Use coarse-thread particleboard screws (Type 17 or similar). Pre-drilling recommended for edge fastening within 12 mm of panel edge.

4.0 Common Defects & Quality Control

- Reject if surface delamination (blistering) exceeds 25 mm in any direction.
- Reject if core voids (pockets) larger than 6 mm diameter are visible on cut edges or faces.
- Reject if thickness variation exceeds ± 0.010 inches (0.25 mm) across the panel width.
- Reject if panel is out-of-square by more than 0.0625 inches (1.6 mm) diagonal difference.
- Reject if moisture content is below 4% or above 10% (risk of warping or adhesive failure).
- Reject if surface has visible resin spots, oil contamination, or discoloration covering more than 5% of the panel area.
- Reject if edge chipping (from sawing) exceeds 1 mm depth on finished panels.
- Reject if internal bond strength (IB) is below 0.40 MPa (58 psi) per lot sample testing.
- Acceptable warp: maximum 0.5 mm per 300 mm (0.002 inch per foot) for panels stored flat.

5.0 Storage, Handling & WHMIS Guidelines

Industrial Particleboard Core must be stored in a dry, climate-controlled environment to prevent moisture absorption and dimensional changes. The material is combustible and generates respirable wood dust during machining, which is classified as a hazardous substance under WHMIS.

- Store panels flat on a level surface, supported by stickers (spacers) every 24 inches to allow air circulation.
- Maintain storage area temperature between 15°C and 30°C (59°F – 86°F) with relative humidity 40–60%.
- Shelf life: 12 months from date of manufacture when stored under recommended conditions. Use FIFO (first-in, first-out) inventory rotation.
- WHMIS Classification: Combustible dust (WHMIS 2015 – Flammable Solids Category 1).
- Hazard statements: H228 (Flammable solid), H335 (May cause respiratory irritation), H373 (May cause damage to lungs through prolonged or repeated inhalation of dust).
- Precautionary statements: P210 (Keep away from heat/sparks/open flames), P261 (Avoid breathing dust), P280 (Wear protective gloves/protective clothing/eye protection).
- Mandatory PPE: Safety glasses with side shields, N95 respirator (or higher) when machining, cut-resistant gloves for handling, and hearing protection for sawing/routing operations.
- Fire safety: Use Class A extinguisher (water, foam, or dry chemical). Avoid using water on large dust piles to prevent dust explosion.
- Spill procedure: Sweep or vacuum dust (use HEPA-filtered vacuum). Do not use compressed air for cleaning to avoid airborne dust clouds.
- Disposal: Dispose of waste as non-hazardous solid waste per local regulations. Uncured resin dust may be classified as hazardous in some jurisdictions.

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