Miter-Saw Blades

How much does a good cut cost?

BY MICHAEL STANDISH

My first power miter saw radically changed the way I worked. It was much faster than hand-mitering, and the saw's accuracy let my block plane take an early semiretirement. It wasn't long, though, before the blade that came with the saw showed signs of decline. I sprung for an aftermarket blade that produced a dramatic improvement at an equally dramatic price.

Today, miter-saw blades still span a wide price range, but the quality gap between most and least expensive has narrowed. At the same time, refinements in blade design and manufacturing make picking a miter-saw blade pretty murky business.

A survey of 10-in., 60-tooth blades

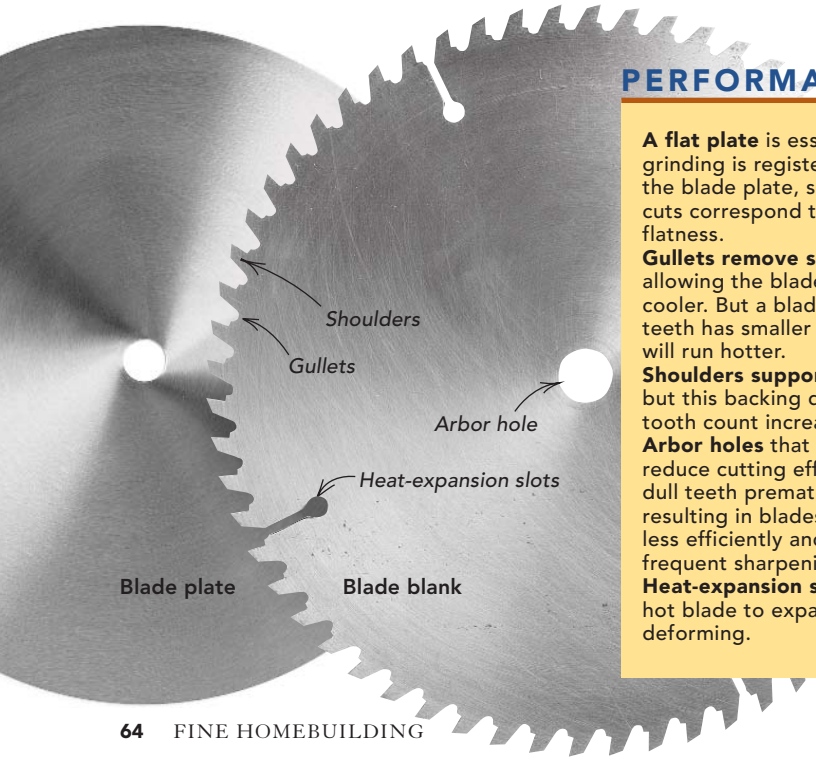
To shed some light on making a purchase, I compared seven 10-in. miter-saw blades that cost from around $27 to $129. The goal wasn't to survey every blade from every manufacturer, but to see how seven commonly available blades cut compared to their cost. All the blades in my test group are 60-tooth blades with an alternate-top-bevel (ATB) grind.

After cutting various materials with each blade, it was plain that great results cost a good deal of money. It also was clear that lower-priced blades are capable of producing very good work. Because these blades look so much alike, you might wonder why there's any difference in performance or price.

Sawblades don't like heat

Making top-notch sawblades calls for some complex design trade-offs, but that's not the half of it. Premium materials and meticulous manufacturing also are necessary.

For example, adding more teeth to a blade is a seemingly simple way of reducing scuffed edges and splintered faces. But additional teeth cause hotter-running blades, which can lead to burned or glazed workpieces. Exces-



PERFORMANCE DEPENDS ON A WELL-MADE BLADE

A flat plate is essential. Tooth grinding is registered from the blade plate, so precise cuts correspond to plate flatness.
Gullets remove sawdust, allowing the blade to run cooler. But a blade with more teeth has smaller gullets, so it will run hotter.
Shoulders support the teeth, but this backing diminishes as tooth count increases.
Arbor holes that are oversize reduce cutting efficiency and dull teeth prematurely, resulting in blades that cut less efficiently and require frequent sharpening.
Heat-expansion slots allow a hot blade to expand without deforming.

Carbide teeth can vary in quality

Teeth are made from tungsten-carbide particles suspended in a cobalt binder. Placed in tiny molds, this compound is sintered (or baked under pressure at high temperature), forming tooth blanks of nearly finished dimensions. Higher proportions of tungsten carbide coupled with finer particles produce keener, longer-lasting edges and increase manufacturing costs.

We tested these seven sawblades, priced from $27 to $129

Penn State Industries
800-377-7297
www.pennstateind.com
C60; $27

Woodworker's Supply Inc.
800-645-9292
www.woodworker.com
115-493; $31

Freud America Inc.
800-472-7307
www.freudtools.com
LU73M010; $59

DeWalt Industrial Tool Co.
800-433-9258
www.dewalt.com
DW7645; $60

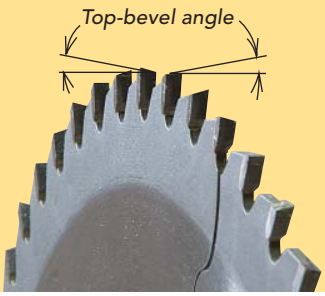
CMT USA Inc.
888-268-2487
www.cmtusa.com
205.060.10; $74

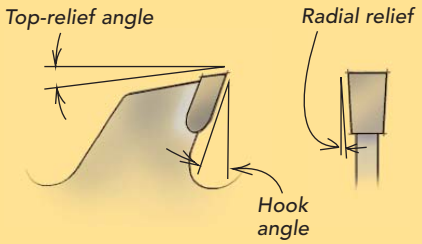
Forrest Mfg. Co. Inc.
800-733-7111
http://forrest.woodmall.com
Woodworker I; $118

Ridge Carbide Tool Co.
800-443-0992
www.ridgecarbidetool.com
RS1000; $129

Top-bevel and hook angles work together

Higher top-bevel angles score the surface of the wood like a knife edge, meaning less splintering, but they're more fragile. The cleanest crosscutting blades combine high top-bevel angles (25° or more) and low hook (or rake) angles (5° or less). Lower hook angles reduce tearout, but require more power.





Relief dissipates heat

Relieving the edges of a tooth along the top and sides allows heat-dissipating dust and chips to escape. Some manufacturers minimize radial relief, which reduces scratch marks, leaving cleaner cut edges. But the trade-off is that more of the tooth contacts the sides of the kerf, again creating more heat.

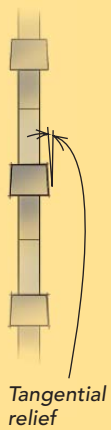


Photo bottom: Chris Green. Drawings: Dan Thornton.

HOW THEY STACK UP

These 1x4 Douglas-fir samples are stacked according to the cost of the blade that cut each piece. Even though results showed that more expensive blades produced better cuts, the difference in price is greater than the difference in cut quality.

- Ridge Carbide Tool Co. **RS1000; $129**
- Forrest Mfg. Co. Inc. **Woodworker I; $118**
- CMT USA Inc. **205.060.10; $74**
- DeWalt Industrial Tool Co. **DW7645; $60**
- Freud America Inc. **LU73M010; $59**
- Woodworker's Supply Inc. **115-493; $31**
- Penn State Industries **C60; $27**

Best and worst cuts in different materials

After making test cuts in a variety of materials, the author found that differences in cutting smoothness were challenging to detect by eye, and even more challenging to portray in photographs. Nevertheless, the most expensive blades (Forrest and Ridge) consistently produced the best cuts (seen on top in each photo). The most noticeable differences occurred when cutting thick poplar and maple.

sive heat also quickens deterioration of carbide teeth and can warp the body of the blade. In addition, pitch buildup aggravates and accelerates the aforementioned problems.

At the manufacturing end, excessive runout from out-of-flat blade plates promotes overheating, especially at the sides of the teeth. Imprecise grinding leads to rougher, hotter cutting. But these concerns are all academic, unless the best materials are selected from a narrow range of suitable steels and carbide compounds. Basically, making a better sawblade involves an intricate array of balancing acts.

Will a good blade make an old saw cut better?

When I started my research, I intended to get a new saw, ask a bunch of manufacturers for their best miter-saw blades, start chopping, inspect the cuts, then see which blade cut the best. Still, recalling that my own sliding compound-miter saw produces excellent cuts with workaday blades, I wondered if this approach would reveal any perceptible differences.

Instead, I borrowed a 20-year-old miter saw and tried out seven 60-tooth, standard-kerf

blades (see p. 65). I wanted to see how much a new blade could refresh the performance of a tired old saw as well as look for links between price and performance.

With each blade, I cut about a dozen samples of 1x4 Douglas fir, which is challenging to cut cleanly, then inspected the results with a magnifying glass. I also cut samples of 2-in. poplar and maple, ½-in. veneer plywood, ¾-in. melamine, spruce 2x4, and 1-in. by 2¼-in. colonial casing.

Smooth on the face, but the edge cuts vary

If any wood will chip, it's Douglas fir. Worse, my test saw left a healthy ¼ in. of unsupported wood on each side of the blade, usually a sure recipe for splintering on the underside. (For tips on getting cleaner cuts, see the sidebar at right.) To my surprise, all the blades produced crisp cuts on both the top and bottom faces of the wood, even under these difficult circumstances.

Scoring and scraping on the freshly cut ends and tearout where the blade exits the board were more common. These cutting flaws increased as the cost of the blade decreased. I found that a relatively steep top bevel can take care of surface splintering (even on the bottom), but reducing scuffed ends and torn-out back edges requires additional measures.

For generating glass-smooth edges, zero radial relief is a good design practice (as found on the Forrest and Ridge blades). But that's only wishful thinking without dead-flat blade plates and absolute uniformity in grinding. I'm also convinced that such precision contributes decisively to clean entry and exit cuts.

The amount you spend depends on the work you do

How much should you spend on a blade? Ultimately, it depends on the work you do. What do you need to accomplish?

The low-cost blades in this survey (Woodworker's Supply and Penn State) deliver a lot of bang for the buck. At about twice the cost of a sharpening, they almost could be treated as throwaway blades. You could use them for framing with no qualms. For finish carpentry, though, there are times when you might want smoother results.

Unless you're engaged in around-the-clock construction or making furniture, blades in the intermediate price range (Freud, DeWalt, and CMT) represent a good value. Twenty years ago, the cuts produced by these blades would have been considered excellent; today, they are merely very good.

Upgrading from very good to top notch means moving up to a Forrest or Ridge blade, and spending almost twice as much. It's a cold, hard illustration of diminishing returns. For the professional, however, the higher cost of a premium blade should pay off over time. There are definitely some hidden cost savings when you buy a premium blade. The teeth on ultraflat, top-drawer blades cut more efficiently because they wear less, and vice versa. These blades stay sharp longer, and they take resharpening better when it's needed. □

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Is my blade dull, or does it just need cleaning?

The day will come when your sawcuts start to look ratty. Before you have the blade resharpened, remember that pitch can be either the cause of or a symptom of cut-quality problems.

Accumulated resins make sharp, true-running blades act dull, while damaged or wobbly blades accumulate pitch more readily. Either way, you've got to clean the blade to see what's wrong.

This can be done with household products like drain and oven cleaners, but I wouldn't use them. They can pack nasty surprises (oven cleaner strips the nonstick coating from sawblades). I soak resin-encrusted blades in a dedicated cleaner (my favorite is Oxisolv; 800-594-9028; www.oxisolv.com) and then scrub them with a small brass brush.

If cleaning reveals dull or chipped teeth, then the blade has to be sharpened or repaired. At $10 to $25 for a 60-tooth blade, this raises a question of economy. Bargain blades almost certainly will need more frequent sharpening than premium blades, and these added costs will eat up any initial purchase-price savings.

Hitting a nasty knot or a buried nail will cost you $4 to $7 per tooth replacement. Because the force sufficient to bust a tooth could well be enough to bend the plate as well, check it for flatness with a good, machinist-grade straightedge.

A FEW TIPS FOR CLEANER MITER CUTS

- **With either a fixed-head or sliding compound-miter saw, use a smooth, unhurried stroke as the blade descends into the stock. After making the cut, slide the workpiece slightly away from the blade (1/32 in. will do) while the saw head is bottomed out, then raise the blade.**
- **When the miter angle deviates from 90°, the blade tends to draw stock toward it. A bit of self-adhesive sandpaper on the fence helps to keep the workpiece from creeping.**
- **To minimize tearout on the bottom and the back (where the blade exits the stock), make an L-shaped cradle of stable Baltic-birch plywood or an equivalent. This creates a zero-clearance backing at the fence and table. The cradle can't block the saw head's travel and should have an L profile that forms a right angle.**