

Fine Woodworking & Fine Homebuilding's

TOOL GUIDE



2015

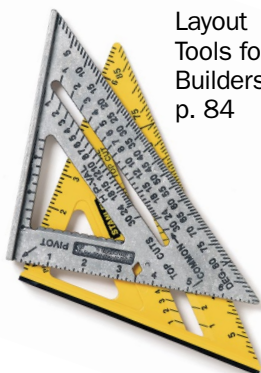
Best tools of the year



14-in. Bandsaws, p. 66



Impact Drivers, p. 42



Layout Tools for Builders, p. 84



12-in. Chopsaws, p. 38



Shop Vacuums, p. 48



Nailers, p. 78

PLUS:
Homeowner's Survival Kit, p. 24



Tool Guide – Winter 2015

214
tools
tested



Biscuit Joiners, p. 50

EXACT- ITUDE. SIZE UP YOUR NEXT JOB IN SECONDS.



Easy one-button measurement separates the Bosch GLM 15 from other laser measures. Advanced Bosch technology makes the GLM 15 the smallest device in its class, but it doesn't scrimp on accuracy. Put precision in your pocket.



See more at
www.boschtools.com/exactitude-tg



BOSCH
Invented for life

The facts are hard to ignore.

Titebond® III outperforms polyurethane glues.

Reference Guide

Glue comparison

What woodworkers need to know!

	Titebond III	Polyurethane Glues
Higher Bond Strength	✓	✓
Exterior Use – Waterproof	✓	
Easy Water Cleanup	✓	
Much Safer To Use	✓	
Shorter Clamp Time	✓	
No Foam – Less Mess	✓	
Shorter Open Time	✓	
Doesn't Stain Skin	✓	✓
Bonds Most Materials	✓	
Bonds Oily / Exotic Woods	✓	
Lower Cost – Better Value	✓	
Longer Usable Shelf Life	✓	

Woodworking Handbook

8 FL. OZ. (237 mL)

Titebond III
ULTIMATE Wood Glue
Rated #1 By Pros
Waterproof
Exterior/Interior
Superior strength
Longer assembly time
Water cleanup
NET 8 FL. OZ. (237 mL)
MADE IN USA

As the leader in wood glues, we want you to know the truth about polyurethane glue and woodworking. A straightforward comparison between Titebond® III Ultimate Wood Glue and polyurethane glue tells the story.

Titebond® III is THE ultimate choice for bonding wood to wood. Period.



www.titebond.com/TBIIIvsPolyurethane



TOOL GUIDE



Impact
drivers,
p. 42

contents

Departments

6 On the Web

8 Letter from
the Editor

10 Best New Tools
Our favorites from the
hundreds we tested
in the past year

18 On the Horizon
Promising new tools
set to hit the market

24 DIY Essentials
A homeowner's
tool kit

118 Maintenance
Protect your tools
from rust

POWER TOOLS

38 12-in. Chopsaws

42 Impact Drivers

48 Shop Vacs

50 Biscuit Joiners,
Head to Head

MACHINES

54 Portable Tablesaws

58 Router Tables

62 Router Lifts

66 14-in. Bandsaws

72 Benchtop Mortisers



Pin, brad, and
finish nailers, p. 78





Homeowner's
tool kit, p. 24



Router
tables, p. 58



12-in. chopsaws,
p. 38

AIR TOOLS

78 Three Small Nailers

82 Handheld Sprayers

HAND TOOLS

84 Builder's Squares

88 Every Woodworker
Needs a Tape Measure

92 Coping Saws

96 Shoulder and Rabbet
Block Planes

ACCESSORIES

100 Toolbox Evolution

104 Paint Strippers

110 The Indispensable
Digital Multimeter

114 Measure Angles
the Digital Way



Shoulder and
rabbet block
planes, p. 96



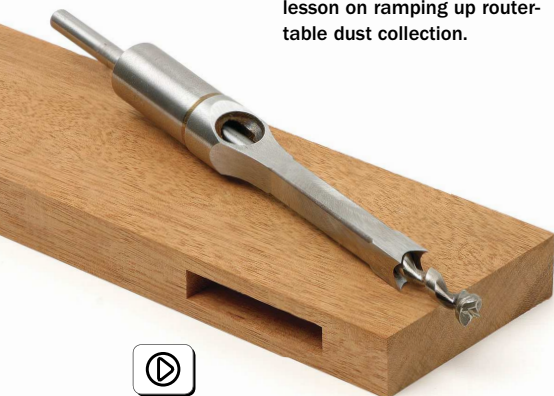
Benchtop
mortisers, p. 72

on the web

free extras at FineWoodworking.com/TG2015

Do-It-Yourself Dust Collection

Keep wood dust and chips at bay with our step-by-step lesson on ramping up router-table dust collection.



Mighty Smooth Mortises

Tune up your hollow-chisel mortising bits for silky-smooth operation with our video tutorial.



Got a Minute?

That's all you'll need to learn something from Mastered in a Minute, *Fine Homebuilding's* new series of short, highly focused how-to videos.

Tips for Better Bandsawing

Follow our soup-to-nuts guide on how to change a bandsaw blade and set up your machine for smoother, more accurate sawing.

Become an online member

Access thousands of exclusive videos and articles by subscribing to FineHomebuilding.com and FineWoodworking.com. You'll also have nearly 40 years of archives at your fingertips.

VIDEO WORKSHOP

Build a Better Router Table

Transform your humble router into a stationary machine able to crank out precision joinery. In our video series, you'll learn how to construct a top-notch router table from start to finish. Lessons include how to:

- Build a strong cabinet from MDF and hard maple
- Build a solid fence with integrated dust collection
- Wire your router table for single-switch activation.



2015 TOOL GUIDE

Tool Guide Editor: Matt Kenney
Art Director: Michael Pekovich
Copy/Production Editor: Elizabeth Healy
Contributing Designer: Catherine Cassidy

Fine Woodworking

Editor: Thomas McKenna
Executive Art Director: Michael Pekovich
Special Projects Editor: Asa Christiana
Senior Editors: Matthew Kenney, Jonathan Binzen, Ben Blackmar
Associate Editor: Dillon Ryan
Assistant Editor: Elizabeth Healy
Senior Copy/Production Editor: Kelly J. Dunton
Deputy Art Directors: John Tetraault, Betsy Engel
Administrative Assistant: William Peck
Shop Manager: Christian Becksvoort
Contributing Editors: Garrett Hack, Roland Johnson, Steve Latta, Michael Fortune, Jim Richey
Methods of Work

FineWoodworking.com
Senior Web Producer: Ed Pirnik
Web Producer: Lisa Morgan

Fine Homebuilding

Editor: Brian Pontolillo
Executive Art Director: Robert Goodfellow
Managing Editor: Debra Judge Silber
Project House Manager: Justin Fink
Senior Editors: Charles Bickford, Andy Engel, Martin Holladay, Rob Yagid
Design Editor: Patrick McCombe
Associate Editor: Don Burgard
Senior Copy/Production Editor: Aaron Fagan
Deputy Art Directors: Dan Thornton, Rodney Diaz
Administrative Assistant: Maureen Friedman
Editors at Large: Kevin Ireton, Charles Miller, Mike Guertin, Rick Arnold, Sean Groom, Gary M. Katz, Joseph Lstiburek
Contributing Writer: Scott Gibson
Contributing Photographers: Lincoln Barbour, Ken Gutmaker, Susan Teare, Brian Vanden Bink
Senior Editor, Books: Peter Chapman

FineHomebuilding.com
Video Producer: Colin Russell
Web Producer: Rob Wotzak

Taunton's Tool Guide: (ISSN: 1930-9589) is published by The Taunton Press, Inc., Newtown, CT 06470-5506. Telephone 203-426-8171. Canadian GST paid registration #123210981.

Printed in the USA





Grizzly Industrial®

PURVEYORS OF FINE MACHINERY®, SINCE 1983!

- OVER A MILLION SQUARE FEET PACKED TO THE RAFTERS WITH MACHINERY & TOOLS
- 2 OVERSEAS QUALITY CONTROL OFFICES STAFFED WITH QUALIFIED GRIZZLY ENGINEERS
- HUGE PARTS FACILITY WITH OVER 1 MILLION PARTS IN STOCK AT ALL TIMES
- TRAINED SERVICE TECHNICIANS AT ALL 3 LOCATIONS • MOST ORDERS SHIP THE SAME DAY



AWARD WINNING MACHINES!



14" EXTREME-SERIES BANDSAW

EXTREME SERIES

MADE IN TAIWAN

- Motor: 1½ HP, 110V/220V, single-phase, 1725 RPM, prewired 110V, 15A/7.5A
- Precision-ground cast iron table size: 20½" x 14" x 1½"
- Table tilt: 45° R, 15° L • Floor to table height: 44"
- Includes deluxe extruded aluminum resaw fence and miter gauge
- Cutting capacity/throat: 13½"
- Maximum cutting height: 6"
- Blade size: 92½" to 93½" L (½" to ¾" W)
- Overall size: 26" W x 67½" H x 30" D
- Approximate shipping weight: 259 lbs.

MADE IN AN ISO 9001
RATED FACTORY

Fine WoodWorking
MAGAZINE

Reviews & Awards

\$99 shipping



G0555X

ONLY **\$825⁰⁰**

10" HYBRID TABLE SAW with Riving Knife

- Motor: 2 HP, 110V/220V, single-phase, prewired to 220V
- Precision-ground cast iron table with wings measures: 27" x 40"
- Arbor: ¾"
- Arbor speed: 3850 RPM
- Capacity: 3⅜" @ 90°, 2⅝" @ 45°
- Rip capacity: 30" R, 12" L
- Quick-change riving knife
- Cast iron trunnions
- Approx. shipping weight: 416 lbs.

TOOL
TESTING
MAGAZINE

Reviews & Awards

Reviews & Awards

SP
US
232857

\$99 shipping



G0715P

ONLY **\$795⁰⁰**

12" JOINTER/PLANER COMBINATION MACHINE with Spiral Cutterhead

MADE IN TAIWAN

- Motor: 5 HP, 220V, single-phase
- Jointer table size: 14" x 59½"
- Cutterhead dia: 3⅜"; speed: 5034 RPM
- Max. jointer depth of cut: ⅝"
- Max. width of cut: 12"
- Planer feed rate: 22 FPM
- Max. planer depth of cut: ⅝"
- Max. planer cutting height: 8"
- Planer table size: 12¼" x 23⅝"
- Approximate shipping weight: 704 lbs.

Fine WoodWorking
MAGAZINE

Reviews & Awards

NEW
END-MOUNTED
FENCE

\$150 shipping



G0634XP

ONLY **\$2350⁰⁰**

12 SPEED HEAVY-DUTY 14" FLOOR DRILL PRESS

- Motor: ¾ HP, 110V, single-phase • Swing: 14"
- Drill chuck: ⅜"-⅝" • Drilling capacity: ¾" steel
- Spindle taper: MT#2 • Spindle travel: 3¼"
- Speeds: 140, 260, 320, 380, 480, 540, 980, 1160, 1510, 1650, 2180, 3050 RPM
- Collar size: 2.595" • Precision-ground cast iron table
- Table size: 11⅜" square • Table swing: 360°
- Table tilts: 90° left & right • Overall height: 64"
- Approximate shipping weight: 171 lbs.

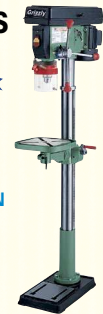
TOOL
TESTING
MAGAZINE

Reviews & Awards

Reviews & Awards

INCLUDES BUILT-IN
LIGHT (BULB NOT
INCLUDED)

\$79 shipping



G7944

ONLY **\$395⁰⁰**

17" HEAVY-DUTY BANDSAW

MADE IN TAIWAN

- Motor: 2 HP, 110V/220V, single-phase, 1725 RPM, TEFC, prewired to 220V, 20A/10A
- Precision-ground cast iron table size: 17" sq.
- Table tilt: 45° R, 10° L
- Cutting capacity/throat: 16¼"
- Max. cutting height: 12⅝"
- Blade size: 131½" L (⅞"-1" W)
- Blade speeds: 1700 & 3500 FPM
- Quick-release blade tension lever
- Approximate shipping weight: 342 lbs.

MADE IN AN ISO 9001
RATED FACTORY

TOOL
TESTING
MAGAZINE

Reviews & Awards

\$99 shipping



G0513

ONLY **\$925⁰⁰**

10" CABINET TABLE SAW with Riving Knife & Extension Rails

- Motor: 3 HP, 220V, 12.8A, single-phase
- Precision-ground cast iron table w/ extension measures: 27" x 74¼"
- Table height: 34" • Arbor: ¾"
- Arbor speed: 4300 RPM
- Max. dado width: 1⅞"
- Capacity @ 90°: 3⅝", @ 45°: 2⅝"
- Max. rip capacity: 50"
- Approximate shipping weight: 557 lbs.

SP
US
232857

\$150 shipping



G0691

ONLY **\$1595⁰⁰**

3 HP CYCLONE DUST COLLECTOR

- Motor: TEFC Class "F", 3 HP, 220V, single-phase, 22A
- Switch: remote controlled magnetic
- Impeller: 15½" steel
- Suction capacity: 1654 CFM @ 2" SP
- Filtration: 99.9% at 0.2-2 microns
- Steel collection drum: 55 gal.
- Overall dimensions: 60¼" W x 93¼" H x 38⅝" D
- Approximate shipping weight: 400 lbs.

SP
US
201825

TOOL
TESTING
MAGAZINE

Reviews & Awards

SHOWN WITH
H7509
OPTIONAL STAND
ONLY **\$275⁰⁰**

\$79 shipping



G0441

ONLY **\$1545⁰⁰**

OSCILLATING SPINDLE SANDER

MADE IN TAIWAN

- Motor: 1 HP, 120V/240V, single-phase, TEFC
- Cast iron 25" x 25" table tilts to 45° left, 15° right
- Ten spindle sizes: ¼" x 5", ⅜" x 6", ½" x 6", ⅝" x 6", ¾" x 9", 1" x 9", 1½" x 9", 2" x 9", 3" x 9", 4" x 9", tapered and threaded
- Floor to table height: 35½" • 1725 RPM spindle speed
- Includes formed and welded steel stand
- Spindle oscillates at 72 strokes-per-minute
- Stroke length: 1½" • Built-in 4" dust collection port
- Approximate shipping weight: 296 lbs.

SP
US
177335

TOOL
TESTING
MAGAZINE

Reviews & Awards

\$99 shipping



G1071

ONLY **\$775⁰⁰**

PRICING CODE
14FINE
MENTION THIS CODE
WHEN PLACING YOUR ORDER
16665

1-800-523-4777

grizzly.com®

TECHNICAL SERVICE: 570-546-9663 • FAX: 800-438-5901

3 GREAT SHOWROOMS!
BELLINGHAM, WA • MUNCY, PA • SPRINGFIELD, MO

VIEW VIDEOS AT
grizzly.com

PayPal VISA MasterCard
BillMeLater AMERICAN EXPRESS DISCOVER

FOLLOW
US:



YOU NEED GOOD TOOLS TO DO GOOD WORK

Anytime a group of experienced woodworkers or home builders is discussing tools, someone is sure to drop the old chestnut that it's not the tool that matters, but the person using it. There is some truth to that. Give a skilled craftsman any tool—even a clunker—and he or she can do good work with it.

But tools do matter. You need good ones—and the right ones—to do your best work. And there are so many tools on the market that you can quickly become disoriented when looking for a new one. If you need a new drill, for example, you must first decide 12-volt or 18-volt, and then you still need to sift through all of the models available in that size. And how do you know which of them is the best?

To truly discover the best tool in a particular category (12-volt drills, 14-in. bandsaws, etc.), you need to get all of them together and compare models firsthand. Of course, that's impossible for an individual who just needs to get that crown molding hung. This is where the *Tool Guide* comes in. We gather the tools and test them head-to-head, determining which one is the Best Overall, and which is the Best Value. That makes it easier for you to get a good tool in your hands so you can do good work.

Matt Kenney, editor
Taunton's 2015 Tool Guide



Fine WoodWorking®

Group Publisher	Anatole Burkin aburkin@taunton.com
VP, Advertising Sales	Rick Straface rstraface@taunton.com
Digital Ad Sales Manager	Noelle Kennedy 203-304-3530 nkennedy@taunton.com
Custom Solutions Manager	Brenden Delaney 203-304-3590 bdelaney@taunton.com
Senior National Account Manager	Linda Abbett 203-304-3538 labbett@taunton.com
Advertising Sales Assistant	Diana Mackey
Director of Advertising Sales Marketing	Karen Lutjen
Advertising Marketing Associate	Laura Holt
Member Audit Bureau of Circulation	 The Audit Bureau
Digital Marketing Director	Sara Ezrin Larsen
Senior Director, Interactive	Michael Stoltz
Web Design Director	Jodie Delohery



The Taunton Press

Inspiration for hands-on living®

Independent publishers since 1975
Founders, Paul & Jan Roman

President	Timothy Rahr
Chief Digital Officer	John Brown
Group Publisher	Anatole Burkin
Group Publisher	Maria Taylor
SVP, Creative & Editorial	Susan Edelman
SVP, Operations	Thomas Luxeder
VP, Single Copy Sales	Jay Annis
VP, Advertising Sales	Rick Straface
VP & Controller	Wayne Reynolds
VP, Human Resources	Carol Marotti
VP, Fulfillment	Patricia Williamson
VP, Product Engineering	Nancy Kopfensteiner

Publishers of magazines, books, videos, and online
Fine Woodworking • Fine Homebuilding
Threads • Fine Gardening • Fine Cooking
taunton.com

Three different awards

Look for these logos in each of our tool tests. Two are from our editors and writers, and one is determined by our readers.



BEST OVERALL

This award goes to the best overall performer, all things considered.



BEST VALUE

This one makes price a stronger consideration, highlighting best buys in every tool category.



READERS' CHOICE

This award is based on our survey of more than 8,000 of our readers.

Power Tools for Real Woodworkers

Engineered Precision



Triton Precision Power Tools has delivered innovative products for the expert woodworker for the last five decades. From award-winning routers, sanders and circular saws, to the ground-breaking SuperJaws and the original Workcentre, Triton has a history of unique design, tailored to the needs of professionals and enthusiasts alike.



Visit the Triton website for more details

tritontools.com

Best Tools

The experts at *Fine Woodworking* and *Fine Homebuilding* test hundreds of new tools each year. Here are our favorites from this year.

Cabinet saw with great perks

Laguna's Fusion 10-in. tablesaw has the beefy cabinet-mounted trunnions, vibration-free operation, and very nice T-square-style fence of a full-size cabinet saw, but sports a 1 $\frac{3}{4}$ hp, 110-volt motor. So you can get the benefits of a cabinet saw, even without a 240-volt circuit in the shop.

When setting up the saw, we had no trouble aligning the cast-iron extension wings flush to the table, and everything was acceptably flat. The blade was parallel to the miter slots, and we measured less than 0.001 in. of runout on the arbor (very impressive). Blade adjustments for height and tilt were smooth and easy, and there was no backlash.

The fence slides smoothly and did not deflect during use. The large paddle switch can be positioned anywhere along the front rail. The blade is surrounded by a dust shroud, and a 2-in.-dia. hose runs from the shroud to a 4-in. port in the cabinet's side. Over all, dust collection was fine.

The motor was plenty powerful for furniture making, easily ripping 4/4 hickory, 5/4 ipé, and 10/4 hard maple. But it can draw up to 30 amps, so you need a circuit that can handle the load.

The saw is loaded with convenient features. A pair of lockable casters lets you move the saw like a wheelbarrow. A bracket on the fence holds the included push stick, and the saw's cabinet has a bracket for storing the fence and a hook for the arbor wrenches.

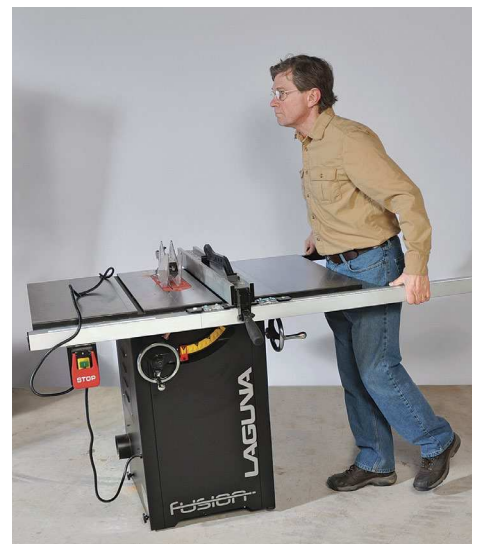


Quick-change riving knife. With the twist of a star knob, you can change from the blade guard to the riving knife in no time at all.



**FUSION
10-IN.
TABLESAW
BY LAGUNA**

■ \$1,295



Unique mobility. Lift up on the fence rails like a pair of wheelbarrow handles, and the saw is ready to roll. The casters lock, so the saw doesn't move when in use.

Fine Woodworking®

To contact us:

Fine Woodworking
The Taunton Press
63 South Main Street
PO Box 5506
Newtown, CT 06470-5506
Tel: 203-426-8171

Send an email:

fw@taunton.com

Visit:

finewoodworking.com

To submit an article proposal:

Write to *Fine Woodworking* at the address above or
Call: 800-309-8955
Fax: 203-270-6753
Email: fw@taunton.com

To subscribe or place an order:

Visit finewoodworking.com/fworder
or call: 800-888-8286
9am-9pm ET Mon-Fri;
9am-5pm ET Sat

To find out about *Fine Woodworking* products:

Visit finewoodworking.com/products

To get help with online member services:

Visit finewoodworking.com/customerservice

To find answers to frequently asked questions:

Visit finewoodworking.com/FAQs

To contact *Fine Woodworking* customer service:

Email us at support@customerservice.taunton.com

To speak directly to a customer service professional:

Call 800-477-8727 9am-5pm ET Mon-Fri

To sell *Fine Woodworking* in your store:

Call us toll-free at 866-452-5179, or
email us at tradecs@taunton.com

To advertise in *Fine Woodworking*:

Call 800-309-8954, or
email us at fwads@taunton.com

Mailing list:

We make a portion of our mailing list available to reputable firms. If you would prefer that we not include your name, please visit:
finewoodworking.com/privacy
or call: 800-477-8727 9am-5pm ET Mon-Fri

For employment information:

Visit careers.taunton.com

The Taunton guarantee:

If at any time you're not completely satisfied with *Fine Woodworking*, you can cancel your subscription and receive a full and immediate refund of the entire subscription price. No questions asked.

Copyright 2014 by The Taunton Press, Inc. No reproduction without permission of The Taunton Press, Inc.

Learning by Doing

Connecticut Valley School of Woodworking

Bob Van Dyke — Director

Featuring hands-on classes for all skill levels taught by nationally known craftsmen including
Will Neptune
Steve Latta
Peter Galbert
Darrell Peart
Christopher Schwarz
and more!

249 Spencer St., Manchester, CT 06040 • 860.647.0303
www.schoolofwoodworking.com

UNIQUE SOLUTIONS



Our Dust Bags Feature

- Optimum Performance
- 1-Micron Filtration
- Custom Designs
- Cleaner Air
- Longer Life
- Proudly Made in USA

Other Products We Offer

- 6-mil Poly Bags
- Quick Release Hose Clamps
- Self Adhesive Foam Gasket
- Custom Transfer Sleeves
- Cartridge Filters



We Fix Dust Collection Problems!

Free Design Assistance for All Custom Made Dust Bags

AMERICAN FABRIC FILTER CO.

www.americanfabricfilter.com 800-367-3591



WoodRiver®



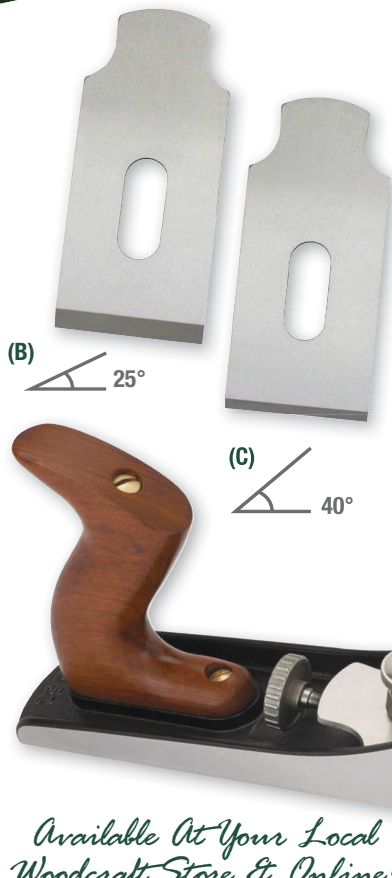
Introducing The New WoodRiver® No. 62 Low Angle Jack Plane

Originally advertised as a plane for heavy stock removal across the grain, the No. 62 has found a home as a smoother and is quite popular among collectors. The WoodRiver® No. 62 is faithful to the original design, but is almost a full pound heavier at approximately 4.6 lbs.

Features:

- Body Cast From Ductile Iron, With A Bed Angle Of 12°
- A Bubinga Tote And Front Knob
- High-Carbon Steel Blade, With A 25° Bevel
- Approximately 14" L x 2.4" W
- 2"-Wide Blade

158755	No. 62 Plane (A).....	reg. \$199.99
158756	25° Bevel Blade (B)	reg. \$19.99
158757	40° Bevel Blade (C)	reg. \$19.99



(B) 25°

(C) 40°

*Available At Your Local
Woodcraft Store & Online!*

14WW09D

WOODCRAFT®

HELPING YOU MAKE WOOD WORK®

For A Free Catalog Or To Find Your Local Woodcraft Store, Visit woodcraft.com Or Call 800-225-1153.
For Information On Woodcraft Retail Franchise Opportunities, Visit woodcraftfranchise.com

Best Tools continued

Grinder has the best tool rests

When we reviewed a full range of 8-in., slow-speed grinders in 2012, many of the machines had bright spots but none possessed the full package—no vibration, large, usable tool rests that are easy to adjust, good-quality wheels, and friendly features. (To read the full review, go to FineWoodworking.com/TG2015.) Unlike the machines in that roundup, Jet's new 8-in. grinder appears to have it all.

The grinder weighs 57 lb., considerably heavier than the other models we've reviewed. The extra heft is welcome, as it helps to dampen vibration. But the real bright spots of the Jet grinder are its tool rests. They are far superior to any stock rests on grinders we have used. They have large, machined cast-iron work surfaces, with vertical lines milled into them to help with blade alignment. Moreover, each one has an easy-to-read angle scale that makes setup and adjustment a snap. Adjustments require no tools—very convenient.

The grinder features high-quality 1-in.-wide Norton wheels (80 grit and 100 grit), but we'd prefer having one coarser wheel. Stout, cast-iron wheel covers are easy to remove for wheel changes. And the $\frac{1}{2}$ -hp motor (1,725 rpm) is well-suited to extended grinding sessions.

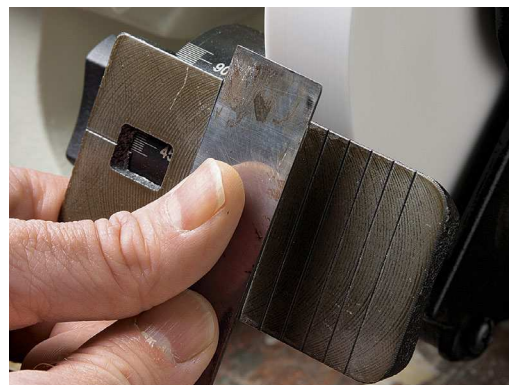
The only real disappointment with the tool was the stamped-steel arbor flanges, which had holes that were slightly off center and caused the flanges to oscillate. That, in turn, led to wheel wobble. Fortunately, we were able to adjust the flanges to eliminate the wobble, but it was a time-consuming process and a nuisance.

In our 2012 review, we couldn't pick a Best Overall because each machine had sub-par tool rests that would need replacing. But with its sizable tool rests, heft, and quality wheels, the Jet is the best grinder we've used.



8-IN. SLOW-SPEED GRINDER BY JET TOOLS

- JWBG-8
- \$330



Visual helpers.
The big tool rests feature an angle scale and reference lines to help keep tools perpendicular to the wheel—critical for accurate sharpening.



ULTIMATE TRIM BITS BY WHITESIDE

- Pattern bit: \$150
- Flush bit: \$140
- Combination: \$150

Shear-cutting bits leave silky surfaces

When we first saw Whiteside's ultimate line of trim bits for routing rough parts flush to a template, we couldn't wait to get our hands on them. These $\frac{1}{2}$ -in. shank, solid-carbide router bits utilize a high-angle, shear-cutting action with a compression effect that pulls material toward the center of the cut, reducing tearout on both edges at once. There are three versions: flush, with the bearing on top; pattern, with the bearing on the bottom; and combination, with bearings on top and bottom. We used the bits on a variety of materials, from hardwoods to Baltic-birch plywood, and even super-dense solid surface material. The results were spectacular. The bits leave a crisp, clean surface with no fuzz.

The bits are only $1\frac{1}{8}$ in. long, which is fine for most projects. But for thicker parts you'll have to make additional passes at a different depth. It would be handy to have a bit length of $1\frac{1}{2}$ in. to 2 in. Also, the $\frac{7}{8}$ -in.-dia. bits have to be run slowly (Whiteside recommends no faster than 18,000 rpm).

These bits are expensive—about double the price of other $\frac{1}{2}$ -in.-shank solid-carbide spiral flush-trimming bits. But the results are worth it, as the bits save the time and labor needed to smooth routed edges. Whiteside's Ultimate Trim Bits have earned a spot in our must-have router bit category.

Safer job-site headphones

The first time *Fine Homebuilding* contributor Mike Guertin wore earbuds to listen to his MP3 player at work, the day ended with his brother threatening to ban headphones from his job sites. "I can't say I blame him," Guertin said. "Not only could I not hear him well, but it also wasn't safe."

The solution was a set of AfterShokz. Rather than playing sound directly into your ear canal, the AfterShokz headset sits just in front of your ears, conducting the sound through the top of your cheekbones. They are perfect for the job site because they let you listen to music while still hearing what is going on around you. You can also use other hearing protection when necessary.

Several models are available, but the newer choices feature smaller clip-on power/control modules and other improvements over previous models. AfterShokz aren't cheap, but if you like music while you work, they are worth every penny.



AFTERSHOKZ EAR BUDS

- Sportz 3, Sports M3
- \$40, \$50

Instant glue creates strong bond

Every now and then you come across a tool that dramatically changes the way you work. Nexabond 2500 is one of those tools. It's the perfect glue for securing fences and other parts to jigs when making furniture. It also works great for gluing solid-wood edge-banding to sheet goods, even around curves. And because it contains no water, it doesn't cause materials like MDF to swell. The bond it forms between parts is amazingly strong, but for critical jig parts you should continue to reinforce the joint with screws.

Application is very easy. Just a few drops is all you need.

Hold the parts together for a few minutes with clamps, and the joint is done. Edge-banding can be trimmed flush after just 30 minutes. But you don't need to rush. Nexabond 2500 remains workable until you bring the two parts together and apply pressure. It is available in three different set times: fast (1 to 3 minutes), medium (3 to 5 minutes), and slow (5 to 10 minutes).

We also tried Nexabond 2500 for slip-tenon joinery on some small tables. The glue acted as a lubricant, making it easier to get the tenons into the mortises. However, joints must be really tight for the glue to activate. Stick with PVA glue for joinery.



NEXABOND 2500 BY SIRRUS

- \$16.50 for a 4-oz. bottle



TRACK GUIDED CIRCULAR SAW BY FESTOOL

- TS 55 REQ
- \$615

Track saw 2.0

Whether you're in a shop or on a job site, the TS 55 EQ track saw is the best, safest method for breaking down sheet goods we've encountered. Now an updated version has been released: the TS 55 REQ.

The inner workings of the saw are the same, but the company has made some changes in the areas of versatility and user comfort. The depth scale for the plunge mechanism is now microadjustable, and it comes with a stick-on imperial scale for those of us who aren't so quick with metric conversions. Bevel capacity on the new saw is improved by 2° (from 45° to 47°), which is helpful when you're ripping stock to make tight mitered corners. The riving knife has been redesigned to emerge from the bottom of the saw before the blade, which is great when you need to continue a long cut but have only a short guide track. Festool also flattened out the right side of the saw so that it can be used as a flush-cutting saw (3/8-in. offset).

Best Tools continued

Lighter worm-drive saw is loaded with features

Most of the buzz about this new saw is that at 13.2 lb., it's the overall lightest worm-drive saw on the market. Skil achieved this weight reduction by relying on lightweight magnesium not only for the guard and the baseplate but also for the motor and the gear housing. We're thrilled about the light weight, but focusing only on that is like saying the best thing about rocky-road ice cream is that it fits in a cone. The MAG77LT has a lot more going for it than that.

For starters, the spindle lock on the MAG77LT is more accessible than on the MAG77 model, making blade changes faster and easier. The depth-of-cut adjustment is marked clearly for $\frac{1}{4}$ -in., $\frac{1}{2}$ -in., and $\frac{3}{4}$ -in. plywood, and for 1x and 2x dimensional lumber. The easy-to-read bevel adjustment has a spring stop that halts the bevel at 45° . Releasing the spring stop allows for bevel cuts all the way up to 53° , a 2° improvement over the MAG77.

The MAG77LT's lower guard is designed to let you make cuts in stock as thin as $\frac{1}{4}$ in. without binding the blade. A slot in the saw's baseplate holds a tool that can be used to replace a blade or brushes, check oil, adjust depth-of-cut and bevel controls, and remove diamond knockouts from blades.



WORM-DRIVE CIRCULAR SAW BY SKILSAW

- MAG77LT
- \$220

About the only visible parts of the MAG77LT that are not magnesium are the handles, which are formed from tough ABS plastic and also sport soft grip pads.

At about \$220, this saw is at the high end of its price category, but considering what went into it, that seems reasonable.

Powerful drill and impact driver are easy on the hands

Bostitch's new 18-volt drill and impact driver are the company's first foray into cordless power tools. The tools have plenty of power, are well-balanced and comfortable to hold, and stand up on the bench without falling over (a feature that we particularly like). Both tools have an LED light to illuminate the target, and variable speed triggers that have a nice range and good feel.

The batteries charge quickly and last a long time between charges. The chargers have an "automatic tune-up" mode that allows you to store the batteries in the charger. It stops charging when the battery is full. But if the battery loses power, the charger kicks back on and tops it off.

We have used smaller 18-volt drills and impact drivers that fit better into tight spaces. And the impact driver doesn't have an adjustable clutch. However, all things considered, this is a nice combo set at a good price.



DRILL AND IMPACT DRIVER KIT BY BOSTITCH

- BTCK410L2
- \$155

Dust Collection



Pat. #
8,377,160



Made in the USA

Most of our
systems are now
ETL certified!



Like us on
Facebook.



Dust Cobra®



3 & 5hp Pro



■ **Certified Full Unit HEPA Vacuum** - Meets EPA RRP Requirements including LEAD.

■ **HEPA Filter Pulse Cleans in Seconds.**

No filter removal - No mess.

■ **Portable - 110V**

■ **1.5 - 20hp Systems and Components**

■ **GE® HEPA (Certified to H-12) Filter Media**

(See specs on website)
included most systems.

■ **Filter Flame Guard Protection**

Included most systems.
Pat. #8,496,719

■ **Complete line of Ductwork and Accessories.**

FREE shipping on ductwork
orders \$300+ / 48 States /
Some restrictions apply

**Nordfab® Quick Fit®
Ductwork Available**

Dust Collection Systems and Components Since 1993.

Call Today for Information!
1.800.732.4065



Order Online! **FREE** Online Catalog!
www.oneida-air.com

Lie-Nielsen
TOOLWORKS®
INC.

Heirloom Quality Tools®

Low Angle
Block Plane



Low Angle Adjustable
Mouth Block Plane

Made in Maine • Materials and workmanship guaranteed for life.

Try our tools at a **Lie-Nielsen Hand Tool Event®** near you!

WWW.LIE-NIELSEN.COM • 1-800-327-2520



ENGRAVE IT. CUT IT. MARK IT.

The finishing touches start here.

- Increase the value of all your woodworking projects with custom laser work.
- Engrave stunning photos, text and graphics with a touch of a button.
- Create custom inlays in minutes – laser engrave a recessed area and fill it with a laser-cut veneer or other composite. It's that easy!



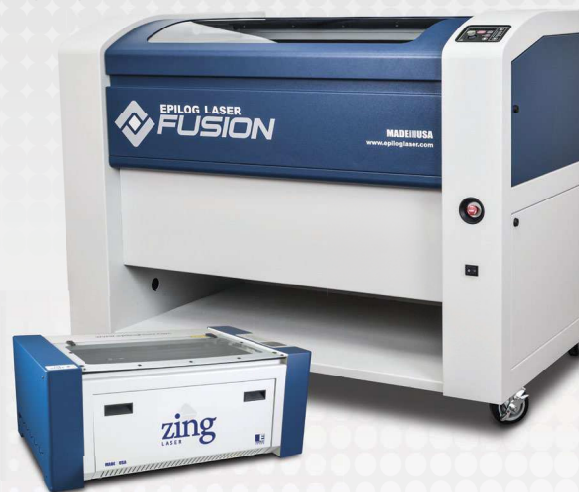
3D Engraving



Inlays



Photo Engraving



Desktop systems starting at \$7,995

To request a brochure, DVD, and samples, contact us at:
epiloglaser.com/fww • sales@epiloglaser.com • 888-437-4564

MADEinUSA
Golden, Colorado

Best Tools continued

Padlock uses your truck key

When you're on the job site, you can end up carrying a lot of things in your pockets, such as a knife, earplugs, mini-flashlight, cash, wallet, keys, and phone. With so much to carry, it makes sense to cut bulk where you can. That's why we were excited about the new series of padlocks, toolbox locks, and trailer-hitch locks made by Strattec called the BOLT series (Breakthrough One-Key Lock Technology) that use a vehicle key. You can now use the same key that you use to start your truck to open your tool boxes or the padlock on your shop.

Here's how it works. The first time you insert your key and open the lock, it "learns" the correct shape. From then on, it works just like any other padlock. These BOLT locks are solid and heavy, with an oversize cylinder that the company says resists bumping and picking.

Locks are available for Ford, Chevy, Dodge, GMC, Nissan, and Toyota pickup keys, as well as the keys of many cars and SUVs. For people looking to simplify their key ring or their daily life in a minor but satisfying way, these locks are money well spent.



BREAKTHROUGH ONE-KEY LOCK TECHNOLOGY (BOLT)

■ Starting at \$25

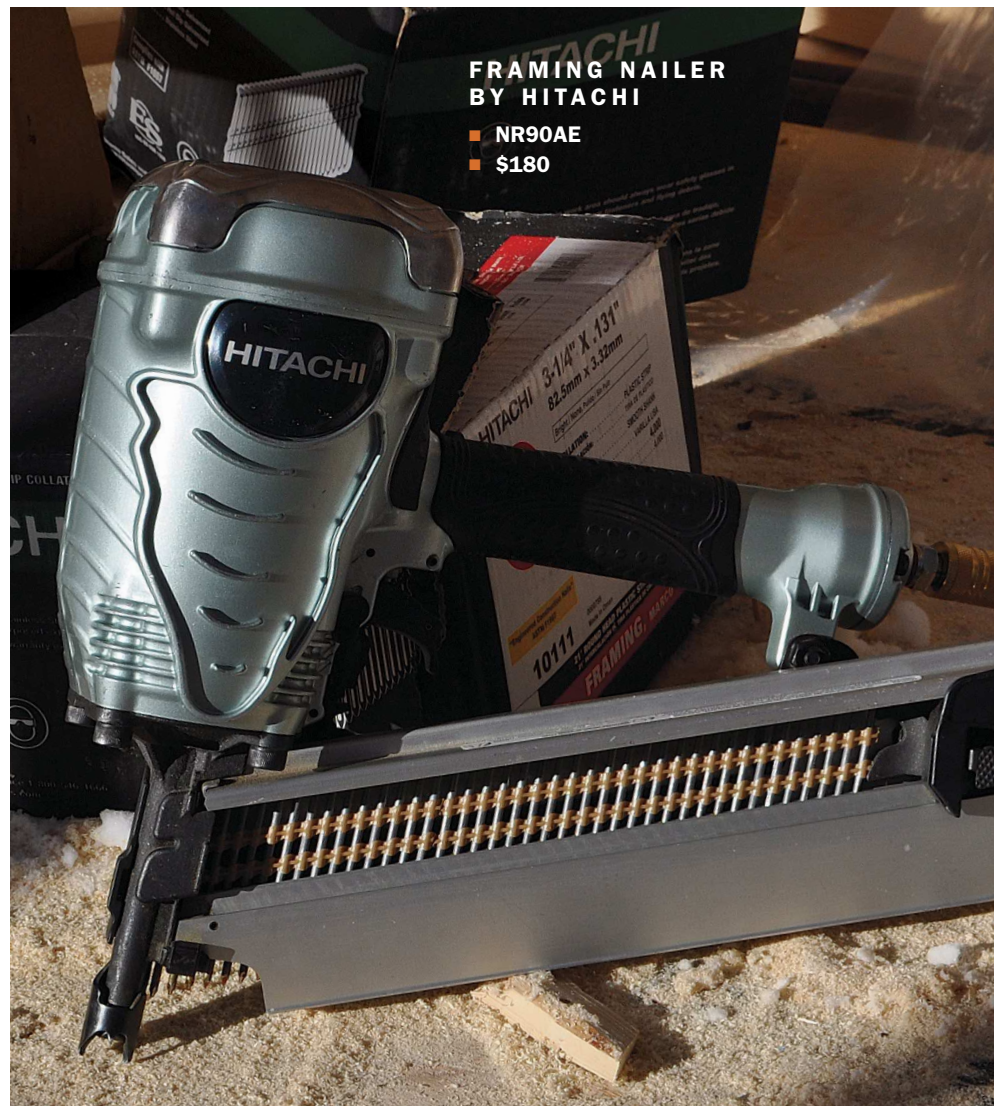
Hitachi bests its classic NR83 nailer

Competitively priced for its feature set, the NR90AE includes toolless depth of drive and an easily accessible switch to flip between sequential-fire and contact-fire modes. It handles 2-in. to 3½-in. full-round-head, plastic-collated stick nails.

The grip size, balance, and vibration-suppressing pads mounted behind the nosepiece make the NR90AE one of the most comfortable framing nailers around. At 7½ lb., it's not the lightest tool in its class, but its balance and proportions are near perfect.

Still, comfort on a framing site is a luxury; durability is a necessity. The NR90AE proved itself in that department, too. The main reason that framing nailers go to the repair shop is a damaged magazine that no longer feeds nails correctly. The NR90AE's magazine is protected fully by anodized aluminum; its only opening is in the tail end, where you load the strips of nails. This magazine is lightweight and remarkably strong—capable of withstanding a blow from a dropped 2x or a clumsy boot.

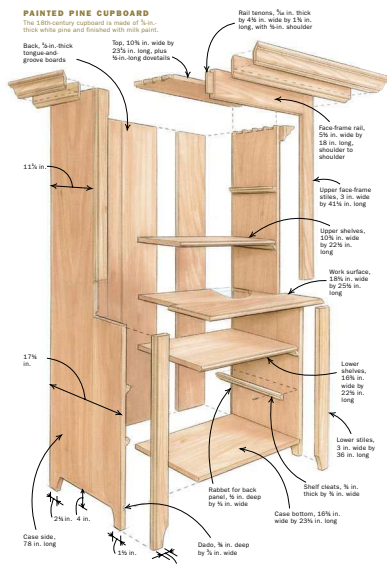
Whether you're looking for your first stick-framing nailer or just replacing an old, tired model, it would serve you well to put the Hitachi NR90AE on your short list of options.



FRAMING NAILER BY HITACHI

- NR90AE
- \$180

Free plans, tips, and more



Sign up for
Fine Woodworking's
FREE eLetter filled
with skill-building
advice, projects,
and more.

Plus get a FREE
project plan when
you sign up today.

*Fine
Woodworking*

Sign up: FineWoodworking.com/eletter



**High Performance Cutting Tools
for Wood, Plastic and Aluminum**



877-465-7012 • www.southeasttool.com



JUST ADD IMAGINATION!

CORE BENEFITS

- * High quality carvings made with ease at an affordable price.
- * The beginner can start making projects with only minimal computer skills while the professional can take advantage of the machines CNC router capability using CAD/CAM software.
- * 500 Grayscale image library included.

MODEL 1013

Maximum work piece
dimension of 13" x 18" x 3".
iPicture software included!



A TRADITION OF INNOVATION™

MODEL 1015 PRO

Work piece area of 15" x 20" x 4".
The 1015 PRO comes with i-Picture
and ArtCam Express software.

Perfect for engraving
signs, lithophanes, 3D
carvings or intricate
parts for projects.



Carving on wood,
1013 & 1015

\$2,099
Model 1013

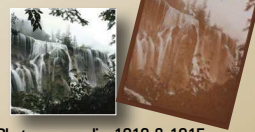
AS SEEN ON
WOODCRAFT.COM,
HOMEDEPOT.COM
& AMAZON.COM!!



3D carving on
Corian 1015



Wood carvings
1015



Photos on acrylic, 1013 & 1015



Moulder Templates
1015



Craft Ideas
1015

WWW.OLIVERMACHINERY.NET | INFO@OLIVERMACHINERY.NET | 800-559-5065

Visit new customer forum: www.olivermachinery.boards.net

OLIVERMACHINERY

WWW.FACEBOOK.COM/OLIVERMACHINERY

WWW.YOUTUBE.COM/OLIVERMACHINERY

On the Horizon

So new we haven't tested them yet, but they look like winners

We haven't had a chance to put these tools through their paces. Some weren't due for release until after the *Tool Guide* went to press. But if you are shopping for something in these categories, give them a close look. Note that some prices may change.



**DELTA 5000 SERIES
TABLESAWS**

■ \$1,100-\$1,500

Delta unveils a new breed of contractor saw

With four different models starting at \$1,100 and slated to be released in September, Delta's new 5000 series tablesaws look to be a nifty update to an old stalwart, the contractor saw.

All four saws are equipped with a riving knife that can be taken out and put back in without tools. There's also a blade shroud that connects to a 2½-in. port in the cabinet's side for dust collection from beneath the table. Under the cabinet is a tubular steel frame with three casters (one of them swivels).

One of the saw's nicer features is a blade brake that stops the spinning blade almost instantly after you switch off the machine, saving time between cuts when you need to clear away an offcut, adjust the rip fence, or make some other change to the setup.

The saw has a cast-iron table (and either steel or cast-iron extension wings), a 1¾-hp motor that can be wired for either 120 or 240 volts, and a T-square rip fence with two rail options: one for 30 in. of rip capacity, and the other for 52 in.

Self-winding air hose is easy to carry

Uncoiling and coiling an air hose every time you use it can suck up a surprising amount of time, but the ReCoiler from pneuPower promises to make the process fast and easy. The briefcase-sized hose reel contains either 100 ft. of ¼-in. hose or 50 ft. of ⅜-in. hose. A handle on the top makes it easy to carry. The maker claims the polyurethane hose maintains its flex down to -60°F. Both the ¼-in. and ⅜-in. ReCoilers sell for the same price (\$145). An optional shoulder strap is \$5. The company also offers a similar rig for extension cords. The 50-ft. 14-gauge ReCoiler sells for \$120.



**RECOILER
HOSE REEL
BY PNEUPOWER**

■ \$145

If You Haven't Tried
Biscuit Joining with
Lamello,
Then You Haven't
Tried Biscuit Joining.

From the Inventors of
Biscuit Joinery...



Lamello Classic X

The ONLY Biscuit Joiner with
a flush-sided baseplate,
swiveling front stop and stop
square for exact positioning
from 0 to 135 degrees!

ALL NEW
Powerful 780 W Motor
Ergonomic Shape
Baseplate

Lamello

1-800-A-LAMELLO
lamello@csaw.com

COLONIAL SAW
MACHINERY SALES AND SERVICE

Woodworker's Supply[®], Inc.

DELUXE ROUTER LIFT SYSTEM

- Exacting fit and finish.
- Fast router bit setups.
- Cast iron top is precision machined with a heavily ribbed underside.
- Stand is heavy duty steel with cross braces for rigidity & durability.



FWA-007 Router Lift Floor System \$1,029.99
Pricing expires on 12/31/14

To order call: 800-321-9841 or visit: pro.woodworker.com

Wood Carving Duplicators

- Furniture
- Gunstocks
- Millwork
- Decoys
- Musical Instruments
- Propellers
- Carved Figures



Incredibly accurate

Thousands of uses! 505-948-0571

www.RadarCarve.net

www.RadarcarveR.com

MIRKA

Innovative Solutions for Wood Finishing

www.mirkawoodworking.us



White Wood Finishing



High Gloss Finishing



Solid Surface Finishing

Introducing Mirka[®] CEROS 3" Detail Sander



- Powerful, brushless DC motor
- Vacuum-ready, 6-hole grip backing pad is ideal for use with Mirka's Abranet[®] mesh abrasives
- 2.5mm orbit for reduced vibration in fine finishing operations
- Digitally controlled variable speeds from 4,000 to 10,000 rpm
- Provides the ideal finish for a variety of applications from spot repairs to finishing in smaller areas where larger sanders cannot reach

*Mirka[®] CEROS is also available in 5" and 6"

Miter saw made for portability

Makita's new LS1018 sliding compound-miter saw weighs just under 44 lb. That's 10 lb. less than its top-of-the-line LS1016 miter saw, 3 lb. less than the Festool Kapex, and up to 20 lb. less than other saws in the same category. The saw sports a direct-drive motor, so every bit of power coming from its 13-amp motor is transferred to the blade. And because there are no belts that can slip, you should experience consistent power throughout the cut. The motor also has soft start and an electric brake to stop the blade quickly after the cut.



**MAKITA
MITER SAW**

■ LS1018
■ \$400

A trio of new tools from Jet

This year Jet will unveil a new drill press, bandsaw, and lathe. The 17-in. drill press (JDP-17) promises to be a great friend to woodworkers. Its large 14-in.-deep by 19-in.-wide cast-iron table is much better for woodworking than the round ones that used to be on every drill press. The quill travels 5 in., enough to drill through-holes in just about any furniture part, and the integrated depth stop means you can drill a series of holes to the same depth. For convenience, it has LED lights to reduce shadows, and one-handed belt tensioning.

The 14-in. bandsaw (JWBS-14SF-3) has a steel frame, a 3-hp motor (240 volts), and 13½ in. of resaw capacity. Other highlights are a redesigned fence with both high and low faces, microadjustability, and a laser-etched scale on the fence rail. The guides adjust without tools, and the throat plate has leveling screws.

The new 1-hp lathe will be available in benchtop (JWL-1440VS, \$1,300) and floor-standing (JWL-1440VSK, \$1,600) versions. It has 14½ in. of swing over the bed, and can fit 40-in. spindles between centers. That's plenty of capacity and power. And if you want to turn really big bowls, this lathe has you covered. The headstock rotates 360° and slides on the bed for outboard turning.



NEW TOOLS FROM JET

- JDP-17 Drill Press, \$740
- JWBS-14SF-3 Bandsaw, \$1,800
- JWL-1440 Lathes, \$1,300-\$1,600



**WERNER
PODIUM LADDER**

■ \$185-\$464

Ladder puts you on a pedestal

If you find it tiresome to work on a stepladder for an extended period of time, check out Werner's new series of Podium ladders, which feature a large platform for standing and make it easier and safer for you to work while facing any direction. The height of the platform ranges from 3 ft. to 10 ft., putting you at a working height comparable to stepladders between 5 ft. and 12 ft. tall. A variety of accessory bins attach to the guard rail at the top of the ladder for storage, and there's even one that works as a paint cup.

THE TS 55 REQ

FESTOOL®
Tools for the toughest demands

THE FIRST CUT IS THE FINISH CUT.

Achieve clean, splinter-free, glue-ready, straight, precise cuts every time. The TS 55 REQ track saw does the work of a circular saw, table saw, miter saw, panel saw and radial arm saw in one unbelievable, take-anywhere power tool. Learn more at tracksaw.com



Bosch impact driver has a socket-ready chuck

Say good-bye to the days of carrying around a socket adapter for your drill or impact driver. Bosch's new impact driver, the IDH182-02L, has a ¼-in. hex chuck that's also a square drive designed to hold ½-in. sockets. The square drive has a pin detent to keep the socket in place. Simply pop the socket onto the square outside of the chuck, and you're ready to go.

The impact driver has a brushless motor, a small grip diameter for comfort, and three LED lights for improved visibility. The tool's speed and torque can be adjusted to suit the job at hand.



BOSCH IMPACT DRIVER

- IDH182-02L
- \$279



KREG FOREMAN POCKET-HOLE MACHINE

- \$400

Budget pocket-hole machine has professional features

The new Kreg Foreman, the latest incarnation of the company's professional level pocket-hole machine, can cut pocket holes up to twice as fast as standard pocket-hole jigs. Its \$400 price is less than half that of its predecessors (which it is replacing), the Kreg Electric and Pneumatic Foreman machines (\$850 each).

The table is cast aluminum, and the base is a strong molded plastic, which means the machine weighs about 20 lb. It has single-handle operation, an adjustable fence, and can handle stock between ½ in. and 1½ in. thick.

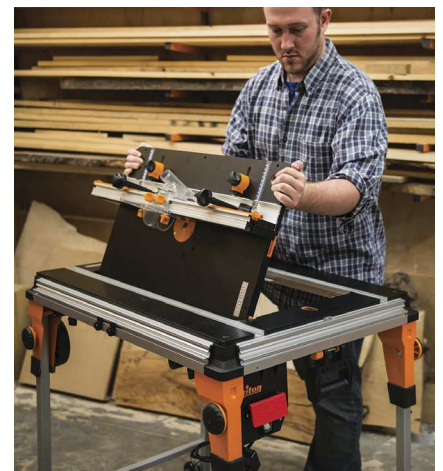
The Foreman is also Kreg's first machine that can cut all three sizes of pocket holes. It comes equipped to drill standard-size pocket holes, while Micro-Pocket and heavy-duty holes can be made with accessory bits. The drill has a quick-change chuck to speed up bit changes.

Triton introducing more tools to the U.S. market

Although Triton has long sold a wide range of tools in other countries, the company is best known in the United States for its plunge routers. That could change in the upcoming year, as Triton is set to introduce a much greater variety of power tools to the States.

At the forefront is Triton's WX7 Workcentre. In its simplest configuration, the Workcentre is a clamping table, but you can add a saw module to turn it into a tablesaw. There's also a router-table module.

Also watch for the Duo Dowel Joiner (\$249) and the geared eccentric orbital sander (\$279). The Duo looks similar to a biscuit joiner, but instead of cutting a slot, it bores two holes for dowels. The sander has a 6-in. pad, metal gearing, and two operating modes: one for rapid removal of material, the other for fine sanding.



TRITON WORKCENTRE

- Starting at \$449

Get answers fast

FineWoodworking.com

The most useful tool in your shop

Fine WoodWorking®

ATTENTION RETAILERS

If you would like to carry *Fine Woodworking* in your store, just write or call 1-866-452-5179, and find out how easy it is to set up an account directly with us—no hassles, no risk, attractive terms.

Taunton Trade Co., Inc.

P.O. Box 5563, 63 S. Main St., Newtown, CT 06470-5563

Lee Valley & Veritas®

1-800-683-8170

www.leevalley.com

Find us on:



Your source for practical workshop solutions.

Shown here are just a few of the Veritas® woodworking tools we design and manufacture. For more information about our Veritas® line of tools and to see our entire selection of high quality hand tools, woodworking supplies and power tool accessories, visit us online.



»TWO CHERRIES«

Quality Tools
Made in Germany
Since 1858



Hand Forged
Quality Handles
Heat Treated to Hold an Edge

1-800-356-2195

www.twocherriesusa.com



Steel City 13" Helical Planer with Carbide Cutters
\$499.99



RIKON
10 inch Bandsaw

Reg. \$299

SALE
\$199.99

5-year warranty



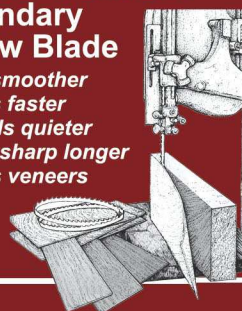
Your shop deserves a SawStop

DON'T WAIT!

WOOD SLICER
Legendary Resaw Blade

- Cuts smoother
- Works faster
- Sounds quieter
- Stays sharp longer
- Makes veneers

FWW
rated best



HIGHLAND
Woodworking

800-241-6748

highlandwoodworking.com

free **WEB TV**
for woodworkers



Hosted by Charles Brock

highlandwoodworker.com

A Homeowner's Tool Kit

Handle everything from emergency repairs to serious home improvement

If you own a home, apartment, or condo, or even if you rent, you need a tool kit. If you've gone as far as purchasing an annual collection of tool reviews, you probably also know that the right tools make the difference between a row of shelves and a string of expletives.

We've put together an essential homeowner's tool kit for everything from emergencies to basic remodeling. Why call a contractor to change a light fixture or paint a room when you can do it yourself and save money?

When cruising local home centers and hardware stores for the tools you see here, we went for brands and models we've had good experiences with. But the point is the type of tool, not the make. Quality does count, so it pays to avoid the low end in most cases. You'll spend close to \$1,000 for the entire arsenal, but you don't have to buy it all at once. And you'll save at least that much every year you own them, by tackling repairs and upgrades on your own instead of making phone calls (and waiting).

Asa Christiana, special projects editor at Fine Woodworking, and Patrick McCombe, associate editor at Fine Homebuilding, contributed to this article.



The core kit

These are the generalist tools, the ones you'll use for all sorts of tasks. Some are designed for electrical or plumbing jobs but are much more versatile than that, so we've included them in the essential kit.

MIDSIZE TOOLBOX, \$20-\$30

A toolbox that's roughly 24 in. long will store most of your tools safely, without breaking your back when you have to drag it out of the garage. Look for durable latches and an interior tray.



BUCKET ORGANIZER, \$10-\$20

These hanging tool bags fit over a standard 5-gal. bucket and are a perfect companion for your toolbox, because they let you bring a specific set of tools to a specific job. There are lots of outside pockets for hand tools and a big inner space for earmuffs, boxes of screws, extralong tools, or whatever else you need for the job at hand.



20-OZ. RIP-CLAW HAMMER, \$28

For nails you'll need a hammer, of course. We recommend a 20-oz. model, which will handle everything from the big nails that are sticking up on your front porch to little brads and staples. The rip-claw design does a better job than a curve claw at pulling big nails.



UTILITY SCISSORS, \$6

A pair of thick utility scissors will cut everything from sheet metal to plastic, including that maddening packaging that most of these tools are sold in.



8-IN. MOLDING BAR, \$10

Your hammer won't pull out nails that are even slightly below the surface, but this tool will. At one end is a small cat's paw, which can be driven into the wood with a hammer. At the other end is a flat pry bar.



NAIL SETS, 3-PACK, \$6

When you install trim, you'll want the nail heads a little below the surface for a clean look. A nail set is the right tool for the job, but it leaves a little hole behind. Use the right nail set to keep that hole as small as possible.



UTILITY KNIFE, \$6

A utility knife is a must. Make enough passes, and this thing will go through carpet and almost anything else.



DIY Essentials continued

The core kit continued

2-FT. LEVEL, \$25

Whether you are leveling the feet of a washing machine or hanging a picture, you'll need a level. The 24-in. size is inexpensive and versatile.

25-FT. TAPE MEASURE, \$23

A 25-ft. tape measure is long enough for almost any job. Choose a tape that's durable and easy to read, with a wide, stiff blade that reaches out at least 10 ft. without flopping over.

CARPENTER'S SPEED SQUARE, \$10

This simple square is designed to be held against a board while you mark 90° and 45° lines. But you can also slide your circular saw against it to make accurate cuts (see p. 86).

4- OR 6-IN-1 SCREWDRIVER, \$6

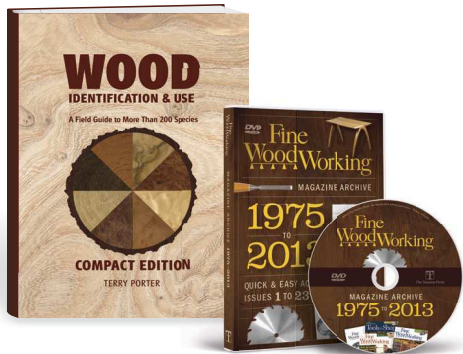
When it comes to screwdrivers, a good value is a multi-bit model, which gives you a whole set in one tool. Double-ended bits store in the tool, and it can take the same bits you use in your cordless drills.

10-IN. PULLSAW (\$20) OR 15-IN. CARPENTER'S SAW (\$14)

These small saws are great for quick cuts, when you don't need a power saw. Traditional carpentry saws (top) are durable and easy to control. Japanese-style saws (bottom) cut on the pull stroke, making it easier to start a cut and avoid binding. They also make finer cuts.



There's so much more to discover with *Fine Woodworking*.



Shop our *Fine Woodworking* Online Store:

It's your destination for premium resources from America's best craftsmen: how-to books, DVDs, project plans, special interest publications, and more.

Visit today at:

FineWoodworking.com/4More

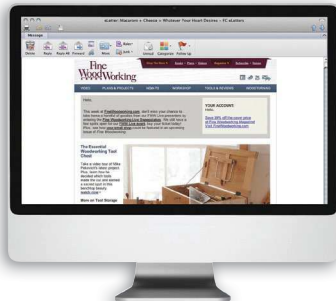


Become a *FineWoodworking.com* Member

Join to enjoy unlimited access to premium content and exclusive benefits, including: 1,400 in-depth articles, over 400 videos from top experts, tablet editions, contests, special offers, and more.

Find more information online:

FineWoodworking.com/4Join



Get our FREE *Fine Woodworking* eNewsletter:

Improve your skills, find new project ideas, and enjoy free tips and advice from *Fine Woodworking* editors.

Sign up, it's free:

FineWoodworking.com/4Newsletter



Subscribe to *Fine Woodworking* Magazine:

Get seven issues, including our annual *Tools & Shops* issue, plus FREE tablet editions. Packed with trusted expertise, every issue helps build your skills as you build beautiful, enduring projects.

Subscribe today at:

FineWoodworking.com/4Sub



The Taunton Press

© 2013 The Taunton Press

The core kit continued

10-IN. LOCKING PLIERS, \$13

Locking pliers will grab and hold anything while you turn or pull it, such as nails or stripped bolts.

10-IN. GROOVE-JOINT PLIERS, \$15

Groove-joint pliers open wide and are especially useful for plumbing jobs.

8-IN. LONG-NOSE PLIERS, \$15

Also called needle-nose pliers, this tool grabs smaller things more precisely, and fits where other pliers can't. The narrow jaws are also good for holding small nails and brads while you drive them, and are ideal for wiring jobs—it even includes a wire cutter.

8-IN. SLIP-JOINT PLIERS, \$7

These standard-issue, two-position pliers are good for everything from twisting wires to squeezing hooks closed to turning nuts and bolts in a pinch.

8-IN. ADJUSTABLE WRENCH, \$13

An adjustable wrench will grab almost anything and save you guessing "standard or metric" and rummaging for an exact fit, as you have to do with the wrench sets below.

SOCKET AND COMBINATION WRENCH SET, \$100

For a positive grip and much more torque on tough nuts, you'll need a socket set and a set of combination wrenches, in both metric and standard sizes. We recommend a set that includes both $\frac{1}{4}$ -in.- and $\frac{3}{8}$ -in.-drive sockets.

SHOP TALK LIVE

Listen up!

Tune in to our Shop Talk Live podcasts to hear our editors interview experts and answer reader questions.

Submit a topic or just listen in at
ShopTalkLive.com



© 2014 The Taunton Press

Study with renowned
furniture maker
Philip Lowe

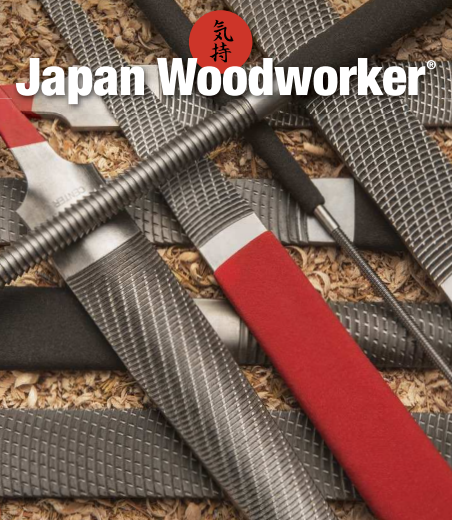
Small classes
furnituremakingclasses.com
978-922-0615

Have you heard?

Fine
WoodWorking®

is now on the iPad and tablets.

Call **800-309-8954**
to learn more about
advertising opportunities!



Iwasaki Files – Superb Control For Shaping Wood

Iwasaki Files cut with surprising speed – like a plane but with very little resistance – yet leave a smooth surface. Suitable for use with all types of wood and plastics.

To check out our selection of products, visit www.JapanWoodworker.com or call 1-800-537-7820 to receive a catalog.

14WW095

THE TRUSTED PINNERS FOR 15+ YEARS

GREX P6 Series 23 Gauge Headless Pinners

Don't be fooled by look-alikes.
Be a better craftsmen with
proven precision built
GREX tools.

P630
No frills workhorse
3/8" to 1-3/16"

P635
The lexus of pinners
3/8" to 1-3/8"

P645
Sophisticated all-rounder
3/8" to 1-3/4"

P650
Trim carpenter's best friend
3/8" to 2"



FIND YOUR DEALER

www.grextools.com 888-447-3926 905-838-4887



The core kit *continued*

HEAVY-DUTY T50 STAPLER, \$18

A T50-size stapler is a construction tool with a host of uses, from attaching insulation and screens to tacking a red flag onto the end of a long board for the trip home from the lumberyard. Get one that is easy to open up and load, and make sure you can squeeze the handle—some are pretty stiff.



HEAVY-DUTY DUCT TAPE, \$9

When all else fails, reach for the duct tape. It's not really for air ducts, but the extra-strength type is perfect for all sorts of emergency repairs.



STUD FINDER, \$30

To hang things from walls, such as shelves and cabinets, you need to know where the studs are. A stud finder is the answer. Better-quality models will find both wood and metal studs through both drywall and the plaster-and-lath you'll find in older homes. They will also detect live wires (to be avoided).

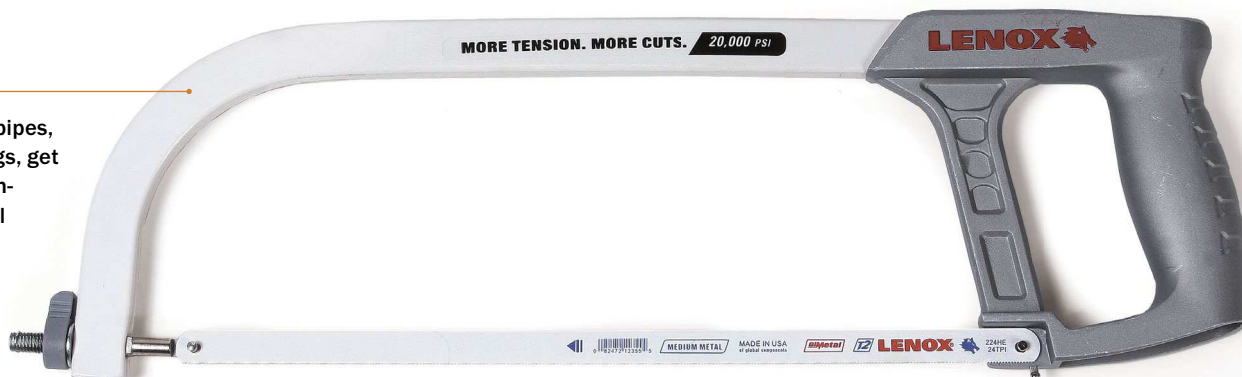
6 FT. FIBERGLASS STEP LADDER, \$70

You might think you can get by with a step stool with just a couple of steps on it, but go for a stepladder. As you climb up to change a smoke detector or light fixture, the ladder gives you something to steady yourself against. We recommend fiberglass. Metal ladders can be dangerous when you are doing electrical work.



HACKSAW, \$17

For cutting off bolts, pipes, and other metal things, get a hacksaw. A medium- or high-tension model will cut straighter and cleaner than a cheaper saw.



8-IN. FILE WITH HANDLE, \$8

To clean up the rough, dangerous edges on those metal cuts, get a general-purpose file. It should have a double-cut pattern on one side for rough work, and a single cut on the other for smoothing.



Plumbing tools

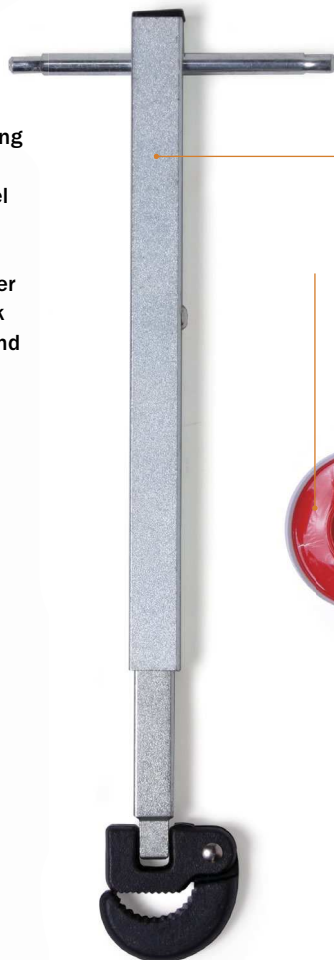
HIGH-CAPACITY PLUNGER, \$7

A plunger is your first line of defense against an overflowing toilet or sink. It pays to get a better model with a tapered end that flips in and out. It creates more power and less splash-back on toilets, and the end flips inward to work on sink and shower drains.



TELESCOPING BASIN WRENCH, \$23

This tool does just one thing, but without it, you'll have a harder time changing a faucet. This long wrench reaches into the tight space behind a sink to release the nuts that hold the faucet in place and make the water connections.



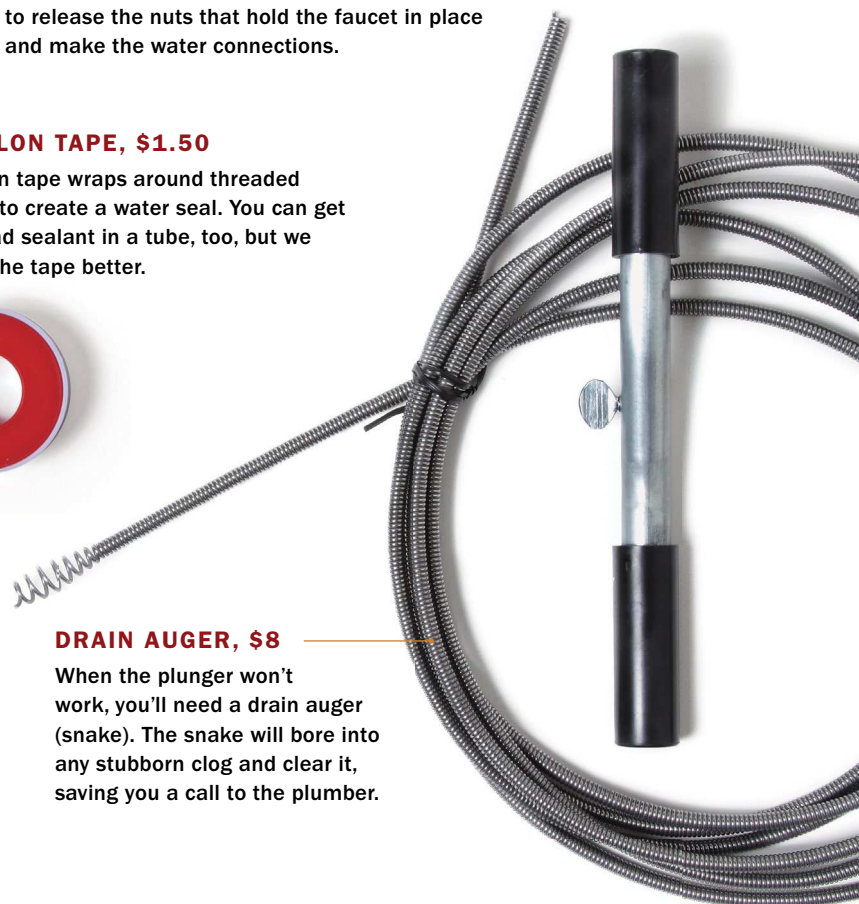
TEFLON TAPE, \$1.50

Teflon tape wraps around threaded pipe to create a water seal. You can get thread sealant in a tube, too, but we like the tape better.



DRAIN AUGER, \$8

When the plunger won't work, you'll need a drain auger (snake). The snake will bore into any stubborn clog and clear it, saving you a call to the plumber.



Tools for electrical work

Like plumbing jobs, many electrical tasks can be handled with your core tool kit, but once again, you need some specialists.

ELECTRICAL TAPE, \$3

Electrical tape is great for cord repairs. It will come in handy for many other electrical tasks, too, like covering exposed wire in a splice made with a wire nut.



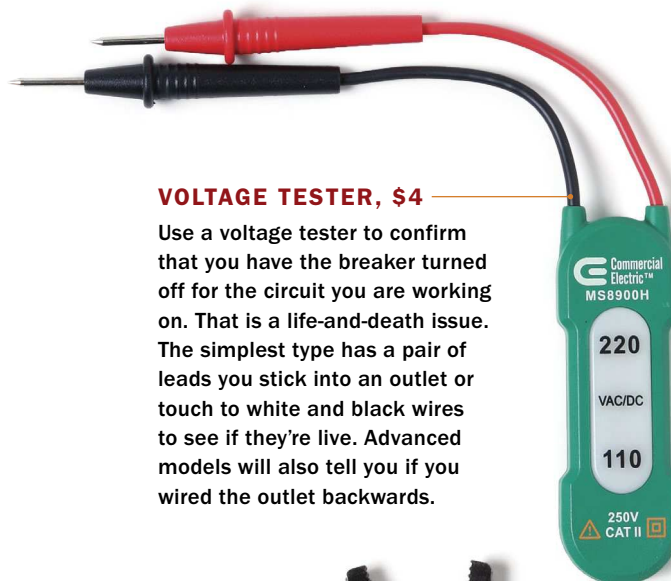
WIRE NUTS, \$2

Wire nuts join wires, such as when adding a dimmer switch or upgrading a light fixture. A variety pack will have the yellow and red sizes you'll use most.



NON-CONTACT VOLTAGE TESTER, \$24

A non-contact voltage tester detects the presence of voltage without touching any wire. It's invaluable for finding live wires. Moving the tester close enough to any hot wire will make it light up. You can also use this tool to check cords and holiday lights for damage.



VOLTAGE TESTER, \$4

Use a voltage tester to confirm that you have the breaker turned off for the circuit you are working on. That is a life-and-death issue. The simplest type has a pair of leads you stick into an outlet or touch to white and black wires to see if they're live. Advanced models will also tell you if you wired the outlet backwards.

WIRE-STRIPPING PLIERS, \$20

An inexpensive set of wire-stripping pliers is ideal for stripping the ends of wires for splices and connections. Better models include a screw cutter, which trims screws that poke too far into electrical fixtures.



PLANS BY *FINE WOODWORKING*

Projects built by you!



...H BED • WINDSOR ROCKER • SHAKER BENCH • QUEEN ANNE LOWBOY • HANGING TOOL CABINET • SHAKER CANDLESTAND • CAB...

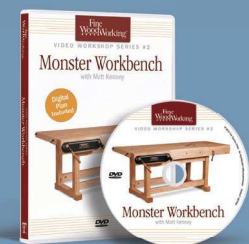


...HELF • TABLESAW OUTFEED CABINET • ARTS & CRAFTS BOOK RACK • DINING TABLE WITH DRAWERS • ADIRONDACK CHAIR • PEN...



Ready to build?

Whatever style you choose, *Fine Woodworking* plans are your roadmap to success. No one offers a better selection of quality projects and accurate plans and how-to videos than you'll find in our store. Shop now.



TauntonStore.com/Wplans

**Taunton
STORE**

A few tools for painting

You'll save a stack of cash by doing your own paint jobs. Here's a collection of tools that will help you do the job right.

ROLLER FRAMES, ROLLER PAN, \$14

To apply paint quickly and evenly to walls, you'll need a 9-in. roller frame (buy roller covers to suit the job) and a roller pan. We also recommend a 4-in. roller for narrow, flat areas on trim and doors.



PUTTY KNIFE, \$5

You'll use this tool for scraping off dried paint and filling nail holes with putty. For the latter task, go for a flexible blade.



PAINTER'S 5-IN-1 TOOL, \$6

This also has a scraper, with a stiffer blade for heavier work, but it does a lot more. It opens paint cans, lets you scrape excess paint off rollers and back into the can, and when wrapped with a rag is the perfect tool for cleaning up wet paint on glass and other surfaces not meant to be painted.



DRIPLESS CAULK GUN, \$3

For sealing against air and water, you'll be using a tube of caulk. To deliver it cleanly and accurately, get a caulk gun. But be sure your gun has a flip-out wire for puncturing a fresh tube, and a cutter for widening the tip.

2-IN. ANGLED SASH BRUSH, \$12

For all of the edges, corners, and moldings, you'll need a good brush. Don't treat it as a throwaway item. Buy the best brush you can for what you are brushing (oil-based or acrylic paint). It will hold more paint, give smoother results, and last for years with proper cleaning. The good news is that a 2-in.-wide angled "sash" brush is probably all you need.



Fine
Woodworking® FineHomebuilding®

2014

TOOL GUIDE SWEEPS

PRIZES PROVIDED BY:

FESTOOL®

Tools for the toughest demands



triton
Precision Power Tools



Lee Valley



Grizzly
Industrial, Inc.®

Lie-Nielsen
TOOLWORKS®
INC.

WOODCRAFT®

STANLEY

ENTER TO WIN OVER

\$2,700

WORTH OF TOOLS
FOR YOUR SHOP

© 2014 The Taunton Press

For complete rules, list of prizes, and to **enter for a chance to win** visit:

FineWoodworking.com/ToolGuideSweeps

Essential power tools

Power tools speed up your work and strip away tedium, but they can be dangerous to ears, eyes, and lungs. So we've included very essential safety gear.

DRILL AND DRIVER BITS, \$10

Get a small set of drill and driver bits. Make sure it includes some long driver bits that will work in an impact driver, with Phillips, flat, and square-drive tips. A few nut drivers are nice, too.



CORDLESS DRILL/IMPACT DRIVER KIT, \$110-\$170

Many people keep a cordless drill on hand, and they use it for both drilling and driving screws. A more economical option is to buy a 12-volt drill/driver kit. With it, you get the standard drill, but you also get the power of an impact driver, which has a vibrating action that makes the biggest screws melt into the hardest wood. An impact driver will also drill holes of all sizes.

With this kit, you can have one tool set up for drilling and the other ready to drive. The drill chuck will take all your old round-shanked drill bits, while the impact driver takes only hex-shanks.



6½- OR 7¼-IN. CIRCULAR SAW, \$80-\$100

You can't do everything with a handsaw—well, you can, but you might be there all day. A lighter, more compact 6½-in. circular saw is big enough to cut up 2x lumber or a sheet of plywood quickly. A model with a 7¼-in. blade will be able to cut slightly thicker boards.



5-IN. RANDOM-ORBIT SANDER, \$50-\$110

A random-orbit sander with hook-and-loop disks can be used to remove loose paint and smooth rough wood. Spend a bit more here to get faster, smoother sanding action.

30-DB EARMUFFS, \$25

Ear damage is cumulative and irreversible, and the loud bang of a hammer can be as bad as the roar of a circular saw. The most convenient and effective form of protection is simple earmuffs. We recommend a 30-decibel noise-reduction rating.



N95-RATED DUST MASK, 2-PACK, \$7

Wood dust is a carcinogen. For sanding and sawing, you'll need a good dust mask. Spend a little more for the thicker, multilayered type rated N95 or better, with a vent so your glasses don't fog. You can use these many times over.

SAFETY GLASSES, \$6

Eye damage is instant and devastating, and even if you wear glasses already, safety glasses are a must. They fit your head closely, and they are rated for very high impact.



6-AMP JIGSAW, \$60-\$80

Your circular saw and handsaw will only make straight cuts. When reality throws you a curve, you'll need a jigsaw. Look for around 6 amps of power. By the way, you can put a metal-cutting blade in a jigsaw, too, turning it into a fast-action hacksaw.

12-in. Chopsaws

Basic miter saw is the most accurate and useful



READERS' RATINGS: 12-IN. CHOPSAWS

Readers agreed with our editors, ranking the Bosch number one. But the Makita and DeWalt saws scored nearly as high.

★★★★★	4.29	BOSCH CM12
★★★★★	4.17	MAKITA LS1221
★★★★★	4.14	DeWALT DW715
★★★★★	3.88	RIDGID R4120
★★★★★	3.57	SKIL 3821-01

When it comes to miter saws, we've found a basic, no-frills chopsaw to be the most accurate and useful model in a woodshop. You don't need to pay extra for features that don't really pay off, such as a big sliding saw, because you probably have a tablesaw and a crosscut sled for wider stock.

We recommend chopsaws that tilt in one direction only, since you can pivot the head sideways for angled cuts of all kinds, rather than tilting it. You won't get furniture-quality cuts with the head leaning over sideways, probably because so much of the blade is engaged in the cut and it is hard to stop the workpiece from creeping sideways. Also, on most saws, a cut that is square to the board with the blade standing up straight suddenly isn't when you tilt the head over sideways. The current crop of saws was no different in this respect: None was able to make a smooth, accurate bevel cut, at least not by furniture-making standards. Miter cuts, as always, were much better, if



The heavy lifters. Doug Dale (in back) and Zane Powell of the Marc Adams woodworking school did the bulk of the testing, working these saws over for four days.

not perfect. We're also not fans of laser guides; in our experience, they don't work in every position.

On the other hand, it is well worth paying for the full 12-in. blade size vs. the 10-in. models. A 12-in. chopsaw has 30% more cutting capacity than its 10-in. counterpart in both width and thickness. These larger models also have more table area, for better workpiece support, as well as a taller and longer fence system.

In the end, just five saws filled the bill, all of them 12-in., non-sliding units that tilt in one direction only.

Tough cutting tests

We tested these saws at the Marc Adams School of Woodworking, and we did it with woodworkers in mind. So we made our test cuts in hardwoods, milled square and true, and modern composite materials like plywood and MDF.

The blades that come with most of these saws are thin, without enough teeth for smooth crosscutting. To level the playing field during the test, we replaced the stock blade on each saw with a higher-quality one.

We compared runout by making 90° cuts in all sizes



BOSCH

CM12

Street price: \$330

Accuracy of cut: Excellent

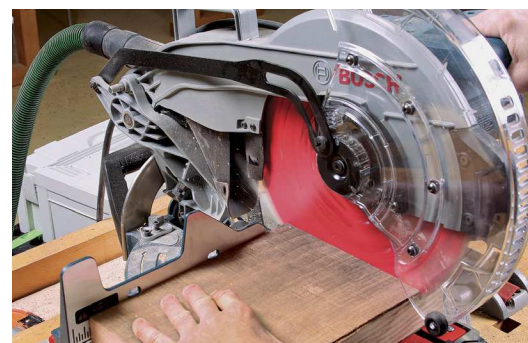
Quality of cut: Excellent



The first thing we noticed about the Bosch were deep milling marks on the table. These turn out to be a big benefit, gripping the wood to keep it firmly in place when cutting miters and bevels. With other saws, you have to maintain a tighter grip to keep workpieces from creeping. The stops and detents for common angle settings needed zero adjustment right out of the box. Also, the Bosch is the only model with a completely flat fence and table. Better yet, it produced the smoothest cuts, and flawless miter joints. Bosch got most of the little things right, too. The dust collection is the best of all the saws and the blade-braking system is smooth and fast. The blade is easy to change, and the guard stays out of the way on its own, the only one to do so. The only flawed feature was the graduated miter scale. The lines are thick and the pointer is imprecise. Also, when you set the pointer accurately at 90°, it is off a bit at 45°. The detents are accurate, though.

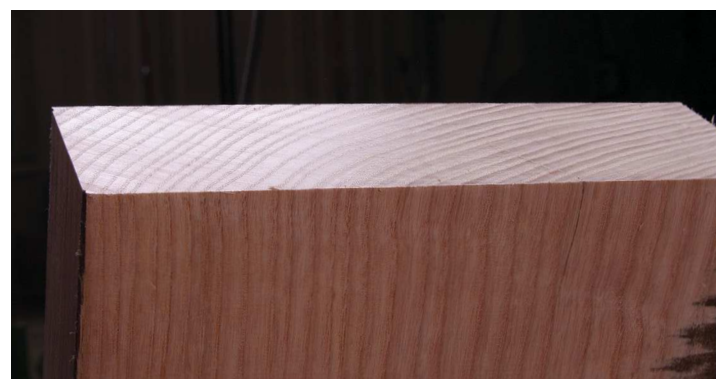


Easy adjustments. Although the Bosch's stops arrived perfectly set already, they are also the easiest to adjust, with a wrench that stows securely on board.



Best dust collection. The Bosch's tall, close-fitting dust port was the most effective on all types of cuts, keeping the shop floor pretty clean.

Scale is off-scale. The only glitch on this tool is a miter scale that reads perfectly at 0° but is off slightly at both 45° settings. The detents are dead-on, however.



Furniture quality. The Bosch was the smoothest cutter, producing glassy cuts on the toughest woods, like this big ash plank.



DeWALT DW715

Street price:
\$250

Accuracy of cut:
Good

Quality of cut:
Good

If you don't need your miter saw to make furniture-quality cuts, there is a lot to like about the DeWalt. The trigger works easily with either hand and doesn't have a second safety trigger, which is a slightly annoying issue with other saws. Changing the blade was easy and the blade guard has large view ports. Also, the table-locking handle is the easiest and most intuitive to use, with 11 detents for common miter settings, more than the other saws. But the cutting action was not as smooth as on the Bosch and Makita saws, and there was a little more runout, especially when cutting miters.



MAKITA LS1221

Street price:
\$315

Accuracy of cut:
Very good

Quality of cut:
Excellent

This is the most solidly built saw, with more metal parts and thicker castings than the others. It has very little runout, smooth cutting action, and a smooth and fast braking system. On the other hand, you must adjust the fence to adjust the miter detent angles, which is inconvenient, and the detents tend to drag the table toward them, making it hard to set up certain miter angles. But our main issue with this saw was that its table was the least flat, which affects cutting accuracy at times.



Ambidextrous. Without an unnecessary safety release, the DeWalt's trigger is easy to operate with either hand.



Great view. Some cuts are easiest to line up by looking straight through the guard at the blade, and the DeWalt's large viewing ports make it easy to line up a pencil mark.



Zero-clearance matters. A shopmade throat plate prevents tearout on the bottom of the cut. All of the units accommodate these, but they are easiest to install on the Makita.



Low point. Sections of the table and fence are not level with each other, affecting the accuracy of some cuts.

and types of materials, checking for accuracy with a Starrett combination square, and adjusting the saw as needed. We also checked the flatness of each of the tables and fences. The Bosch stood out in both of these categories, while all the others had inconsistencies in one or the other. After adjusting the saws in every way possible, our ultimate test for both cut quality and accuracy was making a mitered frame in wide material, and checking for gaps on every side of all four joints. Only the Bosch saw was able to make a flawless frame, though the Makita came very close.

Last, we checked the cutting capacity of each saw, using a 1-in.-thick board. Crosscut capacity was very similar, with each saw able to cut a board very close to 8 in. wide, or slightly wider. But capacity under the blade varied, which would come into play when standing boards up on edge against the fence to turn bevel cuts into miters. The Bosch, Ridgid, and DeWalt saws stood out here, allowing nearly 7 in. under the blade, while the Makita ($5\frac{1}{2}$ in.) and Skil ($5\frac{3}{8}$ in.) saws fell a bit short.

Ease of use matters, too

With five saws set up in a row, it quickly became clear which of the models were easiest to use. We noticed things like angle markings that are easy to read, and triggers that operate comfortably, even when you have to switch hands for certain cuts.

We didn't expect every stop and detent to be dead-on out of the box, but we checked to see how easy it was to adjust them. We discovered that the miter detents are not adjustable on the Makita, Ridgid, and Skil chopsaws—the

fence adjusts instead, which we found less convenient.

Quality of cut also depends on having a zero-clearance insert in the saw's table. Because you will need to replace it from time to time, we made sure that each saw lets you install a shopmade insert. It's not too hard on any of them, but the job is easiest on the Makita.

We didn't factor in weight and portability, since we recommend bolting down your saw in a shop setting. Because we also build table and fence extensions around our saws, we didn't worry about the work supports that all but the DeWalt and Ridgid saws include on both sides of the table, though you might want to factor those in.

We tried the work hold-downs that come with most of the saws, but all moved the stock away from the fence or off the table when tightened. And we also tried the laser guides included here and there, but none proved to be visible and/or accurate in all blade positions. That's fine, because we prefer working to a pencil mark, and using stops for repeat cuts.

Head-to-head results

All of these saws had enough power to cut the widest, thickest plank of hard maple that fits on the saw, but not all were able to produce furniture-quality cuts.

The Bosch CM12 stood clearly above the rest, making clean, precise cuts in the toughest woods. □

Woodworking teacher Marc Adams (marcadams.com) contributed to this article. His staffers Zane Powell and Doug Dale did the testing.



RIDGID

R4120

Street price:
\$300

Accuracy of cut:
Good

Quality of cut:
Fair

The Ridgid has good points but too many negatives.

The dust port is among the largest and most effective, the table scales are easy to read, and the zero-clearance throat plate is almost as easy to replace as on the Makita. Also, the trigger has no safety lock, making it easier to use, and the cutting action is fluid, with the fastest and smoothest brake. However, the miter detents are not adjustable, and it was difficult to adjust the fence. Also, there was blade runout. Despite our best attempts to adjust the stops, we could not get the saw to cut accurate, gap-free miters in our miter test.



Fence problem. On a few of the saws, you must square the fence to the miter detents. On the Ridgid, that adjustment was not possible without filing the attachment holes.



Good dust port. The Ridgid's dust port aligns well with the blade and takes a full-size vacuum hose, making it one of the most effective.



SKIL

3821-01

Street price:
\$220

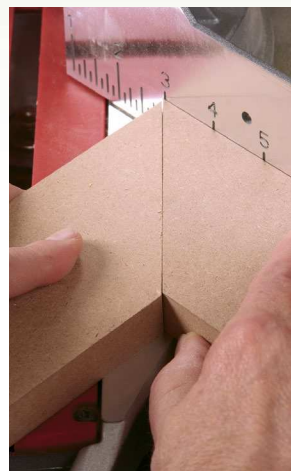
Accuracy of cut:
Poor

Quality of cut:
Poor

This saw has too many problems for us to recommend it. The guard had to be removed completely to change the blade. Also, the arbor nut had been painted over, making it very difficult to remove. But the main problems are with precision and quality of cut. It is difficult to achieve an accurate miter, because the locking knob moves the table sideways when you tighten it. Also, there is considerable runout in the blade, which contributed to the inaccuracy of joinery cuts, and there is no brake.



Slight shift is a big problem. Turning the locking knob shifts the table angle slightly, even when it is locked into a detent.



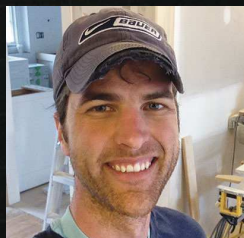
Rough cuts mean gappy joints. Runout in the motor and bearings allows the blade to wobble, which gave the Skil the roughest cuts among the machines tested. These scalloped cuts were the reason the Skil's miter joints wouldn't close.

Impact Drivers

Greater speed and power help these tools beat out standard cordless drills



Many, but not all, of these tools are available with either a compact battery (typically 1.5 amp hours, or Ah) or a larger battery (typically 3.0 Ah). Amp-hour ratings identify only the run-time of the tool between charges, not the power output.



It's easy to see why this tool has become so popular: The simple percussive action of an impact driver translates into more torque than you can get with the rotational power of a cordless drill. This means that the bit, be it a driver bit or a drill bit, does its job with more speed and more power.

Early impact drivers were mostly workhorses meant to provide exactly that, but many of today's models have been designed to provide more finesse. The balance of these traits is where the purchasing decision gets complicated, because it's completely dependent on how you use the tool. Many users are striving to find the right balance between these extremes, but most lean one way or the other.

This variation in the performance traits of impact drivers sets the stage for this three-person review by *Fine Homebuilding* tool expert Justin Fink, and contributors Paul Johnson and Brian McCarthy (shown above, from left). After all, what better way to assess the needs of a wide audience of buyers than to compare the feedback of three testers?

Narrowing the field

This is a big category of tools, so we narrowed it based on a few criteria. First, we chose to focus only on 18-volt lithium-ion (Li-ion) cordless models. A variation on that subcategory is offered by the DeWalt and Porter-Cable tools, both under the same parent company, which are listed as "20v Max." Another comes from Panasonic, whose tool is also compatible with the company's 14-volt Li-ion platform.

Despite the industry's slow transition toward brushless motors, we chose to focus this review on tools with conventional brushed motors, with one exception: a brushless Panasonic driver. Feedback from our readers and information from other sources indicated that Panasonic, though lesser known, is a worthwhile contender in the impact-driver category. For that reason, we felt justified in adding it to this test despite it's being a brushless model.

DeWALT DCF885

with 1.5-Ah battery: \$200 with 3.0-Ah battery: \$260

FINK This tool was my hands-down favorite. It has plenty of power and excellent slow-speed control, and I hardly ever stopped to swap batteries. I found the thin grip to be the most comfortable of the group, and the trio of LED lights mounted around the chuck really floods the work area with light. The battery-release button, similar to that on the Makita models, is simple and effective. My only quibble is that some of the extraneous rubber bumpers on the tool have started to peel off.

JOHNSON The DeWalt is a no-nonsense solid performer on every level. It has enough versatility to let you drive 3-in. screws one after another, then switch to attaching finicky cabinet-door hardware without sacrificing control. The area in front of the chuck is illuminated from all sides, eliminating the shadows that are created by the lights on all of the other drivers. Moreover, the LEDs stay lit for 10 seconds after the trigger is released, which is handy for working in dark spaces. Aside from producing a bit of a “clacky” sound when impacting, this is a smooth-operating driver, is fairly quiet, and has a comfortable grip.

McCARTHY This tool hit the sweet spot for me: It has lots of power, yet the sensitive trigger means that the tool always feels under control. The chuck is large enough to be operated with gloved hands and also allows for easy one-handed bit insertion. The batteries have push-button charge indicators, the belt hook is adequate, and the LEDs do a great job of putting the light just where you need it, and in ample quantity. This driver didn't do any one thing better than the others, but it was the one tool that seemed to do everything well.

BOTTOM LINE

With a near-perfect balance of power and finesse, this driver sets a high bar.



PANASONIC EY75A1

with 1.5-Ah battery: n/a with 4.2-Ah battery: \$470

FINK This driver has the most seamless body design of the tools tested. With hardly a raised seam in the housing or bump when transitioning to the rubber grip, the Panasonic makes me think of the fuselage of a jet. This was the only model in this test with a brushless motor and a selectable speed setting. I didn't like Panasonic's design for the LED light: Not only does its location make it fairly ineffective, but the push button needed to turn it on and off just about guaranteed that I'll never bother with it.

JOHNSON Even though I found a few things to be quirky with the Panasonic driver, it was a pretty solid winner for me. Combining the finesse of the Bosch and Makita drivers with the power of the Milwaukee, it never slowed down. A button controls three levels of torque, from low to high, to protect more-delicate fasteners and work surfaces; however, the tool is so responsive that I hardly ever bothered changing the setting. Despite having the largest battery of the bunch, the tool itself was comfortable to use for long periods of time.

McCARTHY The battery on this tool felt large and boxy (4.2 Ah compared to the more common 3.0 Ah in this category), and it was a bit cumbersome to attach at first. Once I got used to lining up a pair of arrows on the battery and the tool, I found that no other tool allowed for faster, smoother battery changes. The belt hook is nice and wide and is set at a convenient angle, making for easy “no look” grabs. Selectable power levels set this tool apart from the others, and its overall trigger sensitivity and control were excellent. My only annoyance with this tool was the separate on/off switch for the worklight.

BOTTOM LINE

Priced to compete with other high-end selectable-speed brushless models, the Panasonic offers a good balance of guts and responsiveness, all wrapped up in a sleek, comfy design.



MAKITA LXDT04

with 1.5-Ah battery: \$175 with 3.0-Ah battery: \$260

FINK The percussive noise from this lightweight compact tool seemed easier on my ears than the noise produced by the other tools. As an odd contrast to that, though, the motor on the driver I tested had an unpleasant whine and a lack of power when operated at slow speeds. I found the release buttons on Makita's battery packs to be among the easiest to operate quickly. Although it's not a fault of the driver itself, Makita's fan-cooled charger was noisy and made the whole room smell like plastic.

JOHNSON With good balance and the smallest body of the bunch, the Makita quickly became one of my favorites. Even though it tied for the longest time required to sink a 1/2-in. lag screw into a glued, laminated (glulam) beam, it still had more than enough power for most tasks. It had plenty of finesse for driving small hardware screws and starting larger screws in high-torque situations, even without a soft-start feature. I have no complaints about the batteries themselves, but the charger was a bit loud. Also, many users may find its various signals and musical tones to be obnoxious.

McCARTHY My crew already has three Makita impact drivers, so I obviously think they are good tools. Still, I tried to assess this driver as if it were new to me, and I continue to think it stacks right up there with the best of them. The body length is short, making it feel compact and efficient, and its power seemed to be consistently in the middle of the pack. I realized, though, that it lacks the sensitive trigger control found on the DeWalt and Hitachi drivers. If surplus storage is your thing, then you'll love the grossly oversize case that comes with this tool, which is designed to accommodate Makita's 18-volt drill-driver as well.



BOTTOM LINE

Compact without sacrificing function, this model is a rock-solid value.

REAL-WORLD FEEDBACK



The testers were instructed to use the tools in the course of their daily building and remodeling projects, and to set up any head-to-head tests that they believed were representative of real-world demands. To keep things interesting, we forbade communication among the testers until all the reviews were complete.

These pages hold the results of our test. In some cases, all three testers agreed on the value or functionality of a certain feature. At other times, they disagreed. In the end, we found

that the isolated opinions presented a complementary and comprehensive overall look at each model.

In addition to his duties as tool editor for *Fine Homebuilding*, **JUSTIN FINK** is a remodeling contractor whose projects range from frame to finish, with a healthy bias toward custom trimwork and cabinetry. This is where his activity was concentrated, so the comfort and finesse of these tools were the most critical focuses of his testing.

BOSCH 25618

with 1.5-Ah battery: \$200 with 3.0-Ah battery: \$270

FINK The one word I'd use to describe this tool is smooth. The trigger control, hum of the motor, and grip comfort were all superb. It did feel a bit large and clumsy to me, however, perhaps because of its upward-angled body. Also, it would seem that the interbrand competition to create the impact driver with the shortest body length left this tool with a nasty side effect: a chuck collar that's too short to grab comfortably.

JOHNSON I've used Bosch impact drivers for years and always thought they were the best, so I was surprised to find that this tool was only average in heavy-duty testing and for driving long wood screws. Under less strenuous use, however, I still found using the Bosch to be a pleasure. It was comparatively quiet and comfortable enough for all-day use, and its soft-start feature was the best of the bunch in preventing cam outs when working in difficult positions. Although Bosch tools have slowly been transitioning to include batteries with charge indicators, this model doesn't include them.

McCARTHY On the small side, this lightweight driver was comfortable to work with. Excellent control of the tool at the trigger made it a versatile unit capable of wearing multiple hats. Battery packs are sleek in design and attach easily to the tool without much thought. The downsides are a smallish hook that I often had trouble attaching to my belt, and the small chuck, which wasn't very glove-friendly. This tool came in a case that hit the sweet spot for me: room for some peripherals, but not too large.

BOTTOM LINE

All about finesse, this driver is a good choice for those with heavy trigger fingers.



As a general contractor, carpenter, and part-time furniture maker and cabinetmaker, **PAUL JOHNSON** wears many hats. He used these impact drivers on a variety of tasks, from the delicate work of attaching cabinet hardware and fastening drywall to repetitive production-style jobs such as driving boxes' worth of ½-in. to 4-in. wood screws. He rounded out his testing with a series of bench tests that assessed the speed and torque thresholds of each tool.

BRIAN McCARTHY is a carpenter who focuses on framing and exterior trim for both new houses and remodels. Along with his crew of five, Brian put these impact drivers through a wide variety of tasks, ranging from attaching historical windowsills, installing hundreds of hidden deck fasteners, sinking masonry screws into brick walls, and installing a dozen exterior doors. Because of the variety of work he and his crew perform, a combination of power and control was what mattered most to him.

READERS' RATINGS: IMPACT DRIVERS

The Makita driver was the readers' favorite, while the reviewers' choices, the DeWalt and Panasonic, were in the middle of the pack.

★★★★★	4.42	MAKITA LXDT04
★★★★☆	4.37	MILWAUKEE 2650
★★★★☆	4.34	PANASONIC EY75A1
★★★★☆	4.33	BOSCH 25618
★★★★☆	4.24	DeWALT DCF885
★★★★☆	4.13	RIDGID X4
★★★★☆	4.10	HITACHI WH18DSAL
★★★★☆	4.08	PORTER-CABLE PCCK640LB

HITACHI WH18DSAL

with 1.5-Ah battery: \$155 with 3.0-Ah battery: n/a

FINK The Hitachi looks outdated compared to the others in this test, but it still hung with the gang in several respects. It has excellent trigger sensitivity and very good control at slow speeds, making it an ideal choice for delicate work. It feels light and comfortable in the hand. The chin light is a big improvement over the old Hitachi belt-clip/light design, but the battery-release buttons on this tool were easily the worst I encountered.

JOHNSON This driver pleasantly surprised me; in the past, I've found Hitachi's cordless drills to be lacking in power and comfort. It performed right in the middle of the pack for heavy-duty testing and didn't have any trouble keeping up with general day-to-day use. Even though it has the longest body, it is weighted comfortably and has a fairly ergonomic handle that was easy to grip for long periods of time. I found it nearly impossible to remove the battery without wrestling with it with both hands, and I found the single indicator on the charging station—which blinks both when there is no battery docked and when a docked battery is fully charged—rather infuriating.

McCARTHY This tool came with an appropriately sized case with ample storage, good design, solid hinges, and a compact charger that left room for peripherals. Some faults I found were not unique to this model—a tiny chuck and a small belt hook—but to make matters worse, the Hitachi has the longest body of all the tools tested. Despite that, this tool was the most comfortable. The grip is thin, is ergonomically shaped, and felt great all day long. Perhaps because of its long body, the Hitachi has great balance and felt like an extension of my own hand.



BOTTOM LINE

Light, comfortable, and inexpensive proves a powerful combination for this simple tool.

PORTER-CABLE PCCK640LB

with 1.5-Ah battery: \$170 with 3.0-Ah battery: n/a

FINK I typically don't get wrapped up in the appearance of tools, but I thought the Porter-Cable looked cool right from the first glance. I was worried that all the over-molded rubber on the grip would be uncomfortable after a long day of use, but it never bothered me in the least. In terms of features, I found the battery gauge simple and effective, but the belt hook a bit too small and the battery release too stiff. Trigger control wasn't the best, but the pair of magnetic, sidewinder-style bit mounts should become the standard for every drill-driver and impact driver.

JOHNSON The knobby, industrial styling of this driver made me think of a tool built out of Lego blocks; unfortunately, it was almost as uncomfortable. The segmented rubber grips didn't add any comfort to the already wide handle, and the forward/reverse lever is situated in such a way that it pressed against my finger while in use. In most tests, this tool's performance was average, although it tied with the Panasonic for being able to fully drive a 6-in. lag screw into a glulam beam in just 20 seconds. I also liked the one-handed bit changes and the two magnetic bit holders.

McCARTHY The case for this tool appears to be well built and rugged, but it's tiny. If you expect to keep a set of bits in the case, you will not be pleased. The tool itself was very popular with my crew. It has plenty of power for running large fasteners and excellent control at the trigger for delicate work. The chuck is large enough to lend itself to easy bit changes with gloved hands, and I love that it allows for one-handed bit insertion. The tool is balanced well, making it feel lighter than it actually is. This is a comfortable tool to use and an all-around good performer.



BOTTOM LINE

From a best-value point of view, the Porter-Cable is a strong contender. The lack of a large-battery option, though, will mean more trips to the charger.

MILWAUKEE 2650

with 1.5-Ah battery: \$225 with 3.0-Ah battery: \$280

FINK This tool is built like a brick and inspires confidence in terms of long-term durability. It has lots of raw driving power and no shortage of torque, but at times—especially at the slow speeds required for delicate work—it felt difficult to control. I found the stubby chuck collar on this driver to be among the most difficult to operate, and those with smaller hands might have trouble with the fairly thick handle. The smooth, tubular-metal belt hook was far and away the best of any impact driver.

JOHNSON This tool is a speed demon that often left the nearest competitor several seconds behind in the timed screw-driving test. I found this driver just too powerful for some tasks, though, and I cammed out the heads of more screws with the Milwaukee than with any other driver. I also was surprised to find that I wasn't able to sink the ½-in. lag screws fully in my torque testing. This tool also has the biggest body of the bunch and felt the heaviest after extended use. For amenities, it has a nice, bright LED light, a charge display on its batteries, and a case that seems indestructible.

McCARTHY The case that comes with this tool is ideal: It's big enough to hold the tool and some accessories without requiring an engineering schematic, but small enough to be tucked away in a corner of the truck. Compared to the batteries of the other drivers, the larger of the two Milwaukee batteries is pretty boxy. This tool appeared to have the most power of the group, making short work of everything I could throw at it, but the trade-off was very little control at the trigger. While I'd gladly lend it to the excavator to pull some lug nuts, I'd keep it as far away from delicate hardware as possible.

BOTTOM LINE

This tool offers a hefty dose of speed and power, but if you're prone to cam outs, look elsewhere.



RIDGID X4

with 1.5-Ah battery: \$260 with 3.0-Ah battery n/a, battery available for: \$100

FINK This tool has one of the most easily graspable chuck collars of the tools tested, but it forcefully ejects the bit from the chuck—a feature I appreciate with a blazing-hot jigsaw blade but don't understand on an impact driver. The grip is longer than on other models, making it harder to apply downward hand pressure to a fastener. I also found the location of the paddle switch for the light to be annoying, and the pinch buttons for the battery release to be awkward. I couldn't help but feel a little robbed that this tool is priced similar to others but includes just one battery.

JOHNSON I wasn't overly impressed with the Ridgid. In addition to being a bit of a slowpoke in my lag- and long-screw driving tests, it was the only driver to come with just one battery instead of two, which meant downtime during recharges. The LED lights are activated by a low-profile, grip-mounted trigger, a feature I alternately liked and didn't. I found myself overly conscious of it during hard use, worried that I would squeeze the switch too hard and break it. I also found it hard to press both battery-release buttons when wearing gloves, even thin ones.

McCARTHY I like the soft-sided zippered case that the Ridgid came in. Unless you need to stack your miter saw on top of it, the case provides adequate protection in a supercompact package. I also liked the belt hook, the one handed-bit insertion, and the on-board battery-level indicator on this tool. I didn't like the lack of control at the trigger, which required too much finesse to avoid overdriving fasteners in certain situations. I also found that this tool made the most racket of the drivers tested.

BOTTOM LINE

On the verge of forgettable, this driver barely makes the grade and denies you a second battery.



In the past several years, the lowly shop vacuum has transformed from the dull canister brought in to clean the floors after a day of work to an essential, often high-tech tool found on job sites and in shops. An increased understanding of the health benefits of keeping dust out of the air helped to spark this transformation. Nowadays, most tools are designed with dust ports to connect to vacuums, and adapters are commonplace for retrofitting older tools. Features such as tool activation and self-cleaning filters are becoming more common and have greatly increased the versatility of the traditional shop vac.

How we chose

There are a host of shop vacuums on the market, so rather than focusing on any specific size or feature, we reviewed vacuums that would work well for general job-site and shop use. Beyond that, we looked at cost, availability, capacity, features, and functionality. All of these models can be fitted with HEPA filters if they don't already come with them, and all can be fitted with disposable filter bags. Likewise, all are on wheels and can be lifted or pulled around easily. The hoses range in length from 7 ft. all the way up to 16 ft.; the longer hoses are especially helpful when used with sanders or other tools that need a wide range of motion. All of the vacuums tested have power cords at least 15 ft. long, a welcome change from the standard short power cords of yesteryear. We also considered availability and cost. There are several brands of worthy shop vacuums that could have been included in this review, but ordering the vacs themselves, let alone finding parts or accessories, was often restricted to specialty shops and online outlets. Regarding cost: While there are some excellent vacs on the market that cost over \$1,000, we decided to stay under \$700 or so—not an outrageous price for a well-made tool that is used nearly every day. □

Paul Johnson contributed to this article.

Shop Vacs

Only the best vacuums can handle both fine dust and heavy pickup



READERS' RATINGS: SHOP VACS		
Readers preferred the Festool and Fein to the editors' choices for this tool.		
★★★★★	4.76	FESTOOL CT-36
★★★★☆	4.55	FEIN TURBO II 9-20-28-236-09-0
★★★★☆	4.22	BOSCH 3931A-PBH
★★★★☆	4.09	MILWAUKEE 8936-20
★★★★☆	3.94	MAKITA VC4710
★★★★☆	3.88	DEWALT DWV012
★★★★☆	3.84	RIDGID WD1450
★★★★☆	3.61	SHOP VAC 975-16-11



MAKITA VC4710

Street price: \$550 **Capacity:** 12 gal.
Weight: 27 lb. **Noise level:** 59 db.

EPA compliant: Yes **HEPA filter included:** Yes **FILTER CLEANING:** Yes

FEATURES This vac easily handled concrete, drywall mix, sawdust, and other debris during our tests. The self-cleaning action—which kicks on every 15 to 20 seconds—does a great job of keeping the filters clear and the suction strong. The front wheels are prone to snags, but this vac is light and easy to lift when necessary. It's also stable, despite its relatively tall, narrow shape. Filter bags were easy to remove, even when filled with 60 lb. of concrete. We appreciate that this vac came with a cuff adapter to connect tools and other accessories right out of the gate.

FLAWS We disliked the noise and operation of the filter-cleaning function. No matter what speed the vacuum is set at, it ramps back up to full speed for a number of seconds to reverse the airflow over the filters. Plus, the noise of the airflow sounds like a tennis ball being sucked up and whacked into the vacuum. That's a bit unnerving when you're using a table saw or other tool that requires focused attention. Also, the water-level sensor hangs down from the motor inside the body of the vacuum, and got caught every time we tried to put the top back on after emptying the container.

BOTTOM LINE This vac performed toward the top of all the tests and was versatile enough to be used in any situation. Its versatility and ease of use, along with its self-cleaning filter features, made it our choice for Best Overall.



RIDGID WD1450

Street price: \$100 **Capacity:** 14 gal.
Weight: 27 lb. **Noise level:** 90 db.

EPA compliant: No **HEPA filter included:** No **Filter cleaning:** No

FEATURES Primarily geared toward cleanup rather than connecting to tools, this is one of only two vacuums in the test that includes wands and accessories but has no tool-activated mode. The vacuum powered through all the tests without losing much suction, but a few shakes were necessary to keep heavier debris from settling in the larger-diameter hose. The canister of the vac incorporates handholds to help with tipping and emptying the contents, a feature many other models lacked.

FLAWS Although pleasantly throaty, this vacuum can't be called quiet when compared to the other models tested. Its relatively short 7-ft. hose made it necessary to drag the vacuum around—not so easy considering that the small casters got caught up on even the smallest debris. Our tester also got static shocks from the hose, especially when collecting large quantities of material. The powerful exhaust on the vacuum is useful as a blower when needed, but otherwise, it's an annoying drawback when dust and loose materials are in the room. A warning: The first use after cleaning the filter on this vac will give you a burst of residual dust.

BOTTOM LINE This inexpensive tool held up surprisingly well against the more expensive vacs tested. Fitted with a HEPA filter, it's a solid choice for all-around cleanup.



FESTOOL CT-36

Street price: \$675 **Capacity:** 9.5 gal.
Weight: 30 lb. **Noise level:** 71 db.

EPA compliant: Yes **HEPA filter included:** Yes **Filter cleaning:** No
(available on non-HEPA model CT-36A)

FEATURES The Festool is considered by some to be the ultimate shop vac. Its size and shape make it next to impossible to tip over, and its top is easily used as a work surface or for storage of tools and accessories. The large wheels roll over cords and job-site debris better than those on any of the other vacuums tested. With an optional filter bag installed, almost no dust ever reaches the main filter, and the vacuum can power through any task, either tool-activated or manual. The design includes a great cord wrap and hose storage.

FLAWS Unlike earlier versions of this vac, this model has no way to clean the filter without opening the whole unit and removing the filter to shake it out. When vacuuming a mix of fine and heavy debris, the debris helped to keep the filter unclogged by knocking against it. Unless you use a bag when collecting fine dust, though, the filter fills quickly and loses a lot of suction. The 1¼-in.-dia. hose seemed to get snagged more often than the hoses of the other vacs tested, and it clogged when vacuuming planer shavings, nails, and other heavier debris. A larger hose is available and works well, but it costs an additional \$150.

BOTTOM LINE If this vac didn't require a bag to maintain adequate suction, we would pick it as the top choice. Aside from that, the quality and functionality of this tool are without equal.

Biscuit Joiners, Head to Head

The best of these build cabinets in a hurry

READERS' RATINGS: BISCUIT JOINERS

Readers agreed with our editors on the top picks, but chose the Porter-Cable over the Best Value DeWalt.

★★★★★	4.59	LAMELLO TOP 21
★★★★☆	4.30	LAMELLO CLASSIC X
★★★★☆	4.16	PORTER-CABLE 557
★★★★☆	4.03	DEWALT DW682K
★★★★☆	3.92	MAKITA PJ7000
★★★★☆	3.82	MAKITA LXJP02
★★★★☆	3.47	CRAFTSMAN 17539
★★★★☆	3.40	RYOBI JM 82K



Article Extra

Learn how to harness the full potential of your biscuit joiner.

The biscuit joiner is a versatile and easy-to-use tool for numerous applications, from assembling and attaching face frames to reinforcing miters, and it's also great for building cabinet and drawer boxes.

A biscuit joiner is a pretty simple machine. It has a motor and blade, a spring-loaded plunge mechanism that guides the blade, and a baseplate and fence that locate biscuit slots in the work. One hand pushes at the back of the machine to plunge it into the workpiece while the other holds it down at the front end.

We worked with eight machines over several weeks to find out which models performed best. We evaluated all the key components to gauge their accuracy, and we used all of the machines to cut slots for face frames, miters (standing and flat), and cases. The most important test was to check the accuracy of the slot-cutting.

The winners

After putting the machines through a few weeks of work, it was pretty clear that the Lamello biscuit machines were the winners. Professional woodworkers who build a lot of cabinets and don't mind spending top dollar should consider buying the Top 21. The Lamello Classic X is half the cost with most of the same features, so that would be

a more sensible purchase for the serious hobbyist looking for the best machine he or she could afford.

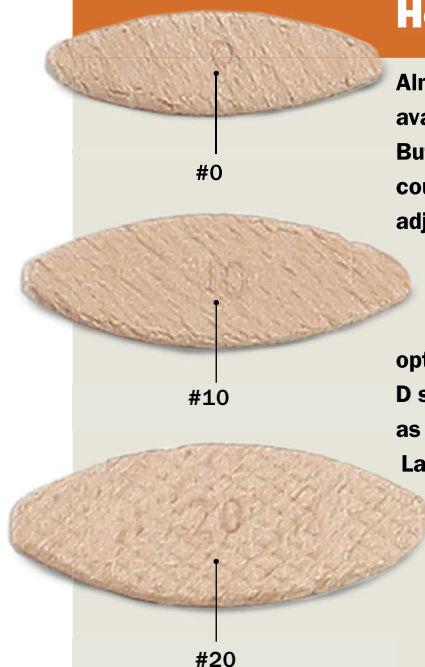
Picking the Best Value was more difficult, as three closely priced tools performed similarly (DeWalt, Makita PJ7000, and Porter-Cable). In the end we picked the DeWalt, because it has a great fence that adjusts easily and holds its adjustments in any position, it's light and comfortable to use, and it's less expensive than the other two. If you don't use a biscuit joiner every day, any of the three would be an excellent choice.

Tony O'Malley contributed to this article.

Photos, except where noted: Thomas McKenna

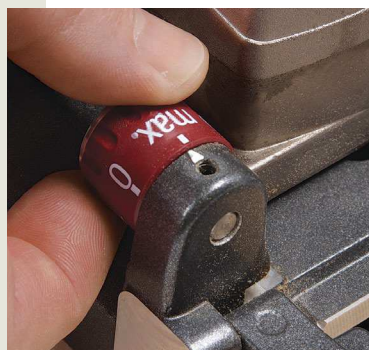
How big a biscuit?

Almost all biscuit joiner work involves commonly available and standard-size biscuits (#0, #10, and #20). But Lamello and Porter-Cable offer different sizes that could come in handy. All of the machines have turret-like adjusters that change the slot size for these different biscuits. In general, you should use the largest biscuit the workpiece can accommodate. By the way, there are also a number of specialty joints and options for biscuit joiners, such as duplex hinges (the D setting) and simplex connectors (S setting), as well as options for making knockdown furniture, such as Lamello's Clamex S system.



"FF" MEANS FACE FRAME

The Porter-Cable 557 has a special FF setting for small biscuits. You need to buy a smaller, 2-in. blade, though, to get the job done (\$50).



LAMELLO GOES BIG—AND SMALL

Both Lamello machines can cut slots for extralarge biscuits (the S6) using the standard blade at the Max setting. They also can cut smaller slots for face-frame biscuits, but you'll need a smaller blade (\$99).

Head to head



LAMELLO

Classic X

Street price: \$600

Fence-angle detents:

22.5, 45, 67.5, 90

Cutting-depth indexes:

0, 10, 20, S, D, Max

Weight: 6.2 lb.

This machine is top-notch, made to high tolerances with a plunge mechanism that slides without play. The fixed-height main fence, which centers slots in $\frac{3}{4}$ in. material, locks solidly at 90° and other angles. To handle other stock thicknesses, the Classic X uses an auxiliary fence that attaches to the main fence via well-machined dovetailed ways. The auxiliary fence also attaches to the base of the machine, making it easier to use the machine vertically. The Classic X is versatile and can use a number of Lamello joinery options, such as the knockdown Clamex S system (requires a special blade). The depth stop is clearly visible on the front of the machine, and adjustments are easy to make. The tool is well-balanced and a joy to use.



LAMELLO

TOP 21

Street price: \$1,195

Fence-angle detents:

22.5, 45, 67.5, 90

Cutting-depth indexes:

0, 10, 20, S, D, Max

Weight: 7.2 lb.

This machine is the cream of the crop in every aspect. The Top 21 has a one-of-a-kind blade-height adjustment feature that makes it easy to offset slots, with the fence or the base as a reference. The adjuster also allows you to cut the wider slots for the Clamex S knockdown system without the need for a specialty blade. The fence setup is the same as the Classic X. The machine is twice as expensive as the classic, and five to six times as much as the other machines. But if you use a biscuiter daily, or would benefit from all the various joinery attachments available, the tool is worth the investment.



DeWalt

DW682K

Street price: \$170

Fence-angle detents: 90

Cutting-depth indexes: 0, 10,

20, Max

Weight: 6.2 lb.

The fence on the DeWalt is simple, reliable, and comfortable to use, even for long sessions. It features a rack-and-pinion height adjustment that keeps it parallel, and a height gauge that's easy to read. The fence has solid, accurate stops at 0° and 90°. But it's the only fence in the group that doesn't have angle detents beyond that, a minor inconvenience that's easy to overlook because the fence locks solidly at any angle. The barrel grip is very comfortable, with a conveniently positioned lock-on trigger switch on the bottom.



CRAFTSMAN 17539

Street price: \$100

Fence-angle detents:
45, 90, 135

Cutting-depth indexes: 0, 10, 20

Weight: 7.8 lb.

The plunge mechanism in this machine has a lot of play, and the machine cut very loose slots that didn't allow us to get an accurate reading during the parallel test. It's heavy but well balanced, and features a comfortable pistol grip; however, the grip makes the tool harder to use in the vertical orientation. The fence is large and has an easy-to-grip handle in front that we like. But it was hard to keep the fence parallel when locking it after adjustments.



MAKITA PJ7000

Street price: \$180

Fence-angle detents:
45, 90

Cutting-depth indexes: 0, 10, 20,
S, D, Max

Weight: 5.8 lb.

The Makita is the lightest of the machines reviewed. Its plunge mechanism is tight and smooth with zero play. Like the Lamellos and the other Makita, it uses a fixed-height main fence, with an auxiliary fence that adjusts in height. The 90° stop on the fixed fence is inexact, and it's easy to lock it a degree or two past 90°. When attached, the auxiliary fence had a bit of lateral play in it, so you have to be careful to check that the fence remains parallel to the base.



MAKITA LXJP02

Street price: \$400

Fence-angle detents:
45, 90

Cutting-depth indexes: 0, 10, 20,
S, D, Max

Weight: 6.8 lb.

This is the same machine as the Makita PJ7000, with the overall fit and finish about the same. It is powered by an 18-volt lithium-ion battery (two batteries are included, along with a charger) that can be shared with other 18-volt lithium-ion tools made by Makita, but the battery pack makes the machine a bit back-heavy. It has sufficient power, but it bogs down more easily if you plunge too quickly. This tool is quieter than any other machine tested.



PORTER-CABLE 557

Street price: \$225

Fence-angle detents:
90, 135

Cutting-depth indexes:
FF, 0, 10, 20, S, D, Max

Weight: 7.2 lb.

This machine has the largest fence of this group, which is an advantage for general use. But the large opening near the blade makes the tool unwieldy on small workpieces. Fence-height adjustments are slow, but the fence remains parallel and holds its settings. The plunge mechanism is smooth and solid. A unique feature is that the top handle is attached to the front of the machine—not to the moving barrel—which gives you better control as you plunge.



RYOBI JM 82K

Street price: \$100

Fence-angle detents:
45, 90, 135

Cutting-depth indexes: 0, 10, 20

Weight: 7.6 lb.

The Ryobi is well balanced and features a comfortable pistol grip; however, the pistol grip makes the tool harder to use in the vertical orientation. The fence is large and easy to grasp. Its height adjusts on tongue-and-groove ways and is guided by a double rack-and-pinion, but the fence tended to shift up or down when it was locked. The plunge mechanism has too much play, which resulted in sloppy slots and loose biscuits.



Portable Tablesaws

Latest job-site tools combine muscle and mobility



The cabinet saw is an amazing tool. With its beefy induction motor, heavy cast-iron components, and generous work surface, it is perfectly suited to all kinds of carpentry and furniture making.

But just try getting one up the stairs.

As a solution, trim carpenters, flooring installers, and other contractors have turned for decades to the portable or “job-site” tablesaw mounted on a collapsible stand. These marvels of convenience and utility are light and compact enough to move easily through doorways or in and out of a truck bed.

Portable tablesaws don’t match the power of their sturdier cousins, but that hasn’t made them less popular in the trades or with do-it-yourselfers. Today, at least a half-dozen manufacturers make portable saws in varying sizes, most for less than \$600. Some are large enough to handle sheet goods.

And, in recent years, the saws have improved in ways that make them more versatile. There are limits, but manufacturers are giving these tools as many “full-size” functions as they can at a smaller size and price.

Manufacturers make a stand

Setting up a portable tablesaw used to mean setting up the stand where you intended to work, placing the saw on it, and then bolting the saw in place.

“If you look back five or six years ago, many of the saws either did not come with a stand or came with a stationary stand with no mobility whatsoever,” says Jason Swanson of Ridgid. “Obviously, the biggest thing has been collapsible stands and the addition of the wheels, which make it very portable from job site to job site.”

Although stationary scissor-style stands are still available, more manufacturers now offer stands with wheels. They also are combining saw and stand into one, and they’re making setup and breakdown as easy as pulling a single lever.

Bosch started the trend 13 years ago with the introduction of its wheeled “gravity-rise stand.” “You can set it up literally by pulling one lever,” says Craig Wilson, the company’s tablesaw project manager, adding that the stand “sets itself up in a matter of seconds.”

Other manufacturers continue to follow suit. For example, Porter-Cable has introduced a collapsible stand with one-step

Up to the job



POWER

Modern muscle. Today's portable saws boast increased cutting power derived from 15-amp motors that spin the blade at 4,500 to 5,000 rpm.



CAPACITY

Small saws, big rips. Although the table surfaces are small, the fences on most saws extend far enough to make ripcuts in wide sheet goods.

setup on the portable saws it sells at Lowe's, a company spokesperson says.

Say good-bye to the old guard

Though designed to protect the user, blade guards are famously unpopular with many carpenters and woodworkers.

A large number of tablesaw users "still have the bias that guards are terrible," says DeWalt product engineer Ross Billings. "They think of the old guard, which is what we're trying to improve."

DeWalt and other manufacturers have introduced a range of designs to make guards more palatable to end users. Perhaps the biggest change has been in kickback prevention, replacing the old-style fixed splitter with a riving knife in the guard that moves up and down with the blade and can be set at different heights.

Other innovations include modular designs that allow different parts of the system to be removed easily, and shields on each side of the blade that operate independently.

Manufacturers also are making it easier to adjust or remove the guards without the need for special tools. The Bosch guard, for



VERSATILITY

Dado-ready. The new saws are accurate and capable of tackling a variety of joinery operations, including handling a stacked dado set.

Guards



Smart guards. Newer blade guards attach and detach much more conveniently than older models.



Riving knives. This improved version of the standard splitter helps prevent kickback and is available on all portable saws. Without a splitter or riving knife, a board can pivot sideways, catch the blade's back teeth, and be propelled toward the user.

instance, pops up and holds itself out of the way so users can check the fence-to-blade distance with a tape before making a cut.

Universal motors, compact designs

Part of the appeal of job-site tablesaws is that they don't need 240-volt electrical circuits. The tradeoff is that they're still powered by lighter but noisy universal motors that don't have as much power as the induction motors on bigger cabinet saws.

"We're trying to give them the same feel and give [users] the sense they can cut those bigger things they would have cut on the bigger saws," says Billings.

Fences



Precise adjustments. Rip fences on portable saws have improved all around. Ridgid's offers a micro-adjust feature that allows changing the fence location in $\frac{1}{64}$ in. increments.



Solid mechanics. DeWalt's fence locks in place atop a pair of extension arms whose movement is synchronized through a rack-and-pinion adjustment system.

One way of accomplishing this is to increase blade speed, from the 4,000 rpm that would have been common five years ago to between 4,500 to 5,000 rpm today, Billings says.

Increasing the energy at the blade tip allows users to cut material more easily. Theoretically, saws running at a higher rpm should lose torque, but it doesn't feel that way to users, he says.

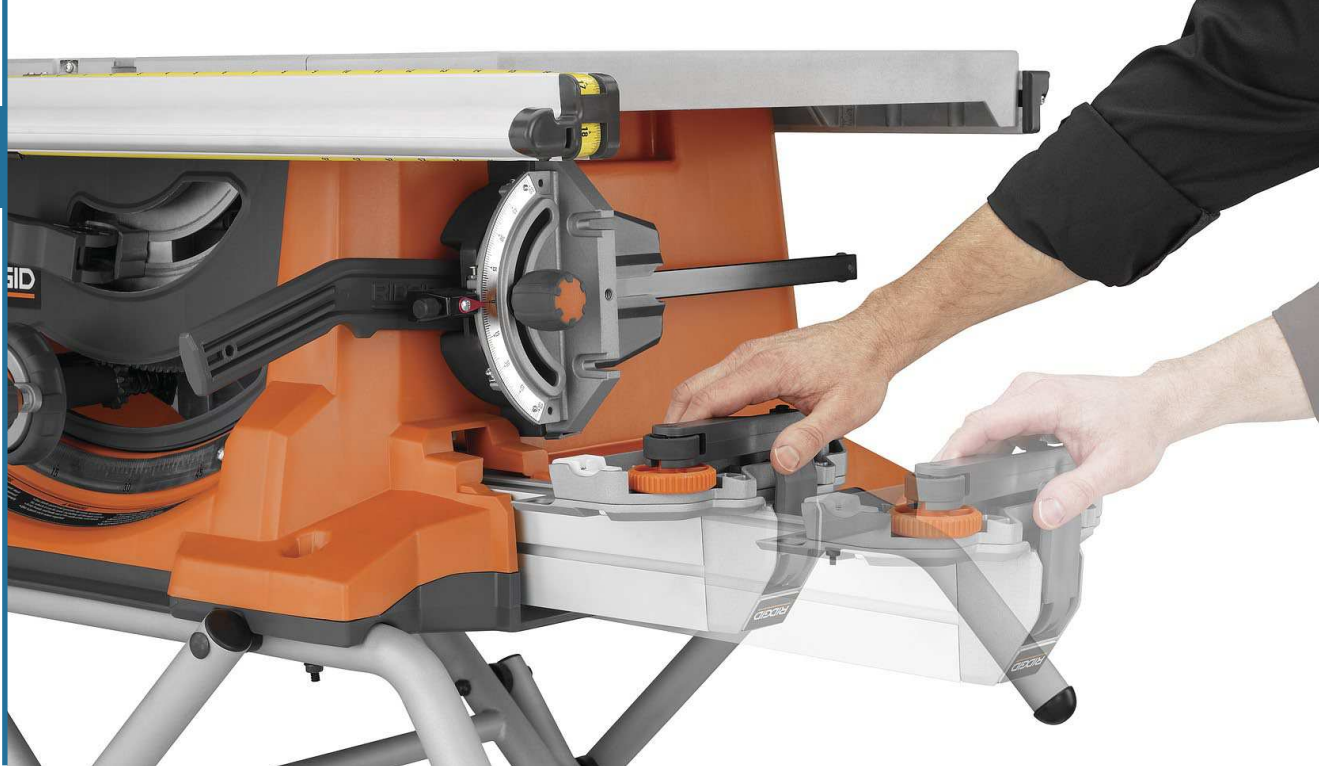
The lower available power on job-site saws makes it important to choose the right blade. It's a good idea to invest in both a rip and a crosscut blade.

Many job-site tablesaws have rip capacities of 24 in. or more to the right of the blade, making it possible to break down sheet

Storage

Smart storage.

Many saws incorporate storage for fences and miter gauges so that these crucial accessories stay with the saw in transit.



goods like plywood or oriented strand board (OSB). But some manufacturers also offer compact models for those who typically work with smaller pieces of stock.

DeWalt's Model DW745, for example, and the Bosch GTS1031 both use 10-in. blades, but have rip capacities of less than 24 in. These saws are lighter than corresponding full-size models. The DW745 weighs 45 lb., vs. the 57 lb. for DeWalt's DW744 model with its 24½-in. rip capacity.

Bosch introduced the GTS1031 two years ago after instructing engineers to come up with a "very robust, very portable" design to augment its existing saw offerings. Installers who don't need huge cutting capacity and may need to lug the saws up and down stairs are the likely target audience.

Coincidentally, Makita's research led it to believe that most contractors aren't interested in having more than one tablesaw. They want one saw that suits all of their needs. Even floor installers occasionally need to cut sheet goods, says Makita residential construction product manager Joe Soto, so at least for now the company doesn't have plans for expanding its line beyond the current model 2705.

Other features that save time or hassle

Several other features that add convenience or utility have been introduced by one or more manufacturers. For example, carefully planned onboard storage keeps accessories within easy reach. Another benefit is that when the accessories—including the fence—are stowed, the tool becomes more compact and can be set against a wall without fear of damaging anything.

Adjustable stock supports, such as the one on the back of the Jet saw, provide extra support for larger pieces of material. The support can extend an extra 12 in. from the back of the table, providing a total of 18 in. of surface.

Enough blade height to cut a 4x4 in a single pass is available on some models, too. The Makita 2705 is one. Some saws also are able to handle stacked-dado sets.

More robust fence designs do a better job of staying parallel to the blade than earlier models. DeWalt offers a rack-and-pinion adjustment it says will stay in proper alignment under a load. Ridgid's saw has a micro-adjust feature that moves the fence in increments of 1/64 in. Fences that clamp front and back are becoming more common as manufacturers in general look for beefier designs. □

Scott Gibson contributed to this article.



Smaller units. For contractors and other users who don't need to break down sheet goods, manufacturers offer smaller, lighter saws with a rip capacity of less than 24 in. The rip capacity on this DeWalt is 16 in.

Router Tables

The best offer flat tables, great fences, and good dust collection

There seems to be no limit to what the router can do. That's why just about every woodworker has one—and why some have more than that. But if you are using the router only as a handheld tool and not mounted in a table, too, then you're not taking full advantage of its versatility. Mounted in a table, the router becomes a super-accurate joinery machine that can spin out perfect sliding dovetails, and tenons that fit their mortises perfectly. You can also rout more consistent edge profiles because you don't have to worry about the router tipping. And it becomes possible to rout small parts, something that's too dangerous with a handheld router.

It's not hard to make a router table in your shop. All you need is a piece of plywood or MDF for the top, and a straight piece of wood for the fence. Bolt the router to the top and you're good to go. Woodworkers have been using router tables like this for a long time, and many still do.

But if you go the simplest route and bolt a fixed-base router to the table, you're stuck having to reach under the table to adjust the bit height. And you'll have to remove the router altogether to change bits. Even if you have a router that makes above-the-table adjustments possible, you probably won't be able to change the bit that way because the table will be too thick to allow the collet to get above it. And a simple fence will be hard to adjust.

So, if you want to add a router table to your shop (or upgrade the one you have), it makes sense to buy a manufactured one.



You'll get a smooth and durable top and a rigid fence that's easy to adjust and mount accessories to. You'll also get dust collection built into the fence, and perhaps even dust collection under the table. The top will accommodate a router lift, which makes it a snap to change bits and bit height from above the table. Add one of those (see pp. 62-65) and a powerful router, and you have a router table that has the same types of adjustment as a shaper, setting up precisely for any task in just a minute or two. It's very difficult to get there with a shopmade table.

With this in mind, we reviewed the manufactured router tables currently available. For accurate work, the table's flatness is critical. So we eliminated laminate tops

with MDF cores from the test because past testing has shown that this material is prone to sagging. That left only tables made from cast iron, solid phenolic, and aluminum—11 tables in all. We'll explain how we tested them, and tell you which router table came out on top, and which one proved itself to be the Best Value.

How the tables were tested

A router table should be flat when weighed down by your router, because one that dips can result in uneven edge profiles and hard-to-fit joinery. So, we mounted a router in the tables and checked their flatness with a straightedge and feeler gauges.

How much dip is too much? In practice, a top that dips more than 0.030 in.

Features to look for



Quick and precise fence adjustments. You shouldn't need tools to move the fence; they only slow things down. A scale on the Excalibur's mounting bracket helps to locate the fence faster.



Adjustable fence faces. The opening between fence faces gets changed often to accommodate different-size bits. Look for a fence, like this one on the Rockler table, that lets you make the adjustments without tools.

(just less than $\frac{1}{32}$ in.) would create problems for edge profiles and joinery. But of course, the less it dips the better. All of the tables dipped, except for the two cast-iron ones and the Woodpeckers PRP-4. None of the tables exceeded the limit, but two came close: the Woodhaven 8243K and the JessEm Mast-R-Top with Mast-R-Fence. Both cast-iron tops actually had a crown, which is better than a dip, because as long as you keep downward pressure on the workpiece right at the bit, you'll get accurate profiles and joinery.

We used a long straightedge to check the fences for flatness. All of them were flat. We also tested the fences to determine if they were square to the table, and every one of them was.

All of the fences have a dust-collection port, which did a good job of clearing chips and dust from the tabletop. But by itself this port can't catch everything, and all but three of the tables allowed piles of chips to form under the tables. The two tables from Excalibur and the Bench Dog have router enclosures with dust ports, and did a great job of collecting the falling chips.



T-tracks make the table more versatile. Use them to attach stops, as on the Excalibur (left), and featherboards, like on the JessEm (right), which allow you to work more accurately and safely.



Dust port keeps the table clean. Clearing chips and dust is crucial to a clean, safe cut. All the tables, including this Woodhaven unit, have a port on the fence. Some also have a port on the router enclosure.



Article Extra

Learn how to ramp up your router table's dust collection capability.

Router tables, head to head



EXCALIBUR 40-200C



Street price: \$1,099

Flatness with plate and router: 0.008-in. crown

Flatness with lift and router: 0.008-in. crown

This table has it all: a cast-iron top that doesn't sag, a versatile and stout fence, a remote power switch, and the best dust collection. The fence is easily positioned with adjustable scales on the mounting brackets. The fence faces are quickly adjusted and simple to replace with shopmade sacrificial fences. A scale on the top of the fence can be set for any bit application, and there are plenty of T-tracks for stops and featherboards. A single 4-in. dust port collects from both the router enclosure and the fence. The router plugs into a push-button switch that can be mounted on either front leg, easily reached by knee or knuckle. Rounding out the assembly is a three-wheeled mobility kit that keeps all four legs firmly on the floor when the single steering wheel is raised.

A clear winner, and a great value

After all of the testing was completed, it wasn't hard to pick the Best Overall router table: the Excalibur 40-200C. Its cast-iron top has a slight crown, which is preferable to a slight dip. The fence is versatile, stout, and easy to adjust. Add excellent dust collection to the mix and you have a table that can't be beat.

The JessEm Mast-R-Top paired with JessEm's Rout-R-Fence and Rout-R-Stand is the Best Value. The stand is strong and makes a nice base for the solid phenolic top, which was nearly dead-flat—it dipped just 0.010 in. But what really makes this table stand out is the fence, which has plenty of T-tracks for attaching accessories and is easy to set up. □

Roland Johnson contributed to this article.



JESSEM MAST-R-TOP WITH ROUT-R-FENCE AND ROUT-R-STAND



Street price: \$560

Flatness with plate and router: 0.010-in. dip

Flatness with lift and router: 0.015-in. dip

Although this table has a good stand and a solid top, it's really all about the fence. It has T-tracks on the front, top, and back, which makes it a snap to attach accessories like featherboards and stops. Edge-banded MDF faces can be adjusted quickly and easily replaced with wood or MDF when sacrificial faces are needed. Mounting brackets on the table's edge eliminate slots in the tabletop. However, there are no scales on the fence mounts or on the fence. There is a dust-collection port in the fence, but not beneath the table. These missing conveniences can be overlooked when you get such a strong performer at a great price.

BENCH DOG CAST-IRON ROUTER TABLE WITH STEEL CABINET



Street price: \$1,000

Flatness with plate and router: 0.005-in. crown

Flatness with lift and router: 0.005-in. crown

The enclosed base offers great storage and good dust collection. The fence is solid. However, to get the most from this table you need a few accessories (an external power switch and a dust-port connector to join the fence and cabinet hoses). The opening for the plate fits only Rockler and Bench Dog plates and lifts, but a plate is included in the price.

EXCALIBUR 40-200P



Street price: \$1,039
Flatness with plate and router:
 0.021-in. dip
Flatness with lift and router:
 0.022-in. dip

This table is identical to the 40-200C, but has a solid phenolic top, rather than a cast-iron one. The phenolic top had a slight dip. Our Best Overall choice, the version with the cast-iron top, costs only \$60 more and has the slightest crown rather than a dip, so choose it rather than this one.

FESTOOL CMS GE BASIC



Street price: \$1,200
Flatness with Festool router:
 0.002-in. dip

This is a compact router table, a great option for the job site, but probably too small for the shop. The fence design is similar to a shaper fence, which allows you to easily offset the infeed and outfeed tables with the turn of a dial. This table fits only Festool routers—the OF 1010 and OF 1400. They're plunge routers that offer above-the-table height changes.

JESSEM MAST-R-LIFT EXCEL II



Street price: \$1,050
Flatness with small motor:
 0.002-in. dip
Flatness with large motor:
 0.008-in. dip

This table is unique because it has a router lift built into it. Height adjustments are wrench-free and instant using a wheel that attaches to the right side of the base. The under-table dust port did not collect enough falling chips to prevent a pile from forming on the floor. The fence port did its job and kept the table clean.

JESSEM MAST-R-TOP WITH MAST-R-FENCE II AND ROUT-R-STAND



Street price: \$630
Flatness with plate and router:
 0.025-in. dip
Flatness with lift and router:
 0.0028-in. dip

This table is identical to the one chosen as Best Value, but with an even nicer fence. There are scales on the mounting brackets, which make it easier to set the fence's distance from the bit and to keep the fence parallel to the miter slot. The fence also has T-tracks for mounting accessories. The fence's dust port kept the table clean.

ROCKLER PRO PHENOLIC TABLE WITH STEEL STAND



Street price: \$500
Flatness with plate and router:
 0.020-in. dip
Flatness with lift and router:
 0.021-in. dip

This table is light but strong, with a sturdy base. The fence is solid, with plenty of T-tracks for accessories, and faces that were easy to move, lock down, and adjust. The dust collection did a good job of keeping the table clear. The opening fits only Rockler or Bench Dog plates or lift (a plate is included in the price).

SOMMERFELD TOOLS ROUTER TABLE



Street price: \$670
Flatness with Triton router:
 0.018-in. dip

This table's top is made from three pieces of aluminum that are bolted together. The piece of aluminum in the middle of the table is pre-drilled for two routers: the Triton TRC001 and the Milwaukee 5625-20, both of which are designed so that you can change the bit and adjust the bit's height from above the table.

WOODHAVEN 8243K



Street price: \$596
Flatness with plate and router:
 0.026-in. dip
Flatness with lift and router:
 0.029-in. dip

A sturdy fence with T-track and rulers highlights this affordable table. The fence clamps easily and securely to the table. Unfortunately, the base is made from flat aluminum extrusions (for the legs) and MDF (for the aprons), making it unstable during heavy use. (Street price includes router plate.)

WOODPECKERS PRP-4



Street price: \$820
Flatness with plate and router:
 0.000 in.
Flatness with lift and router:
 0.000 in.

The fence on this table is one of the best we've used. All of the adjustments are toolless, and the T-track on the fence's top edge can adjust front to back to be flush with the fence faces, or removed to make room for a tall shopmade fence. It also has a dust port for excellent above-the-table collection. A stout open stand supports the table.

Router Lifts

Above-table adjustments and bit changes make setup a pleasure



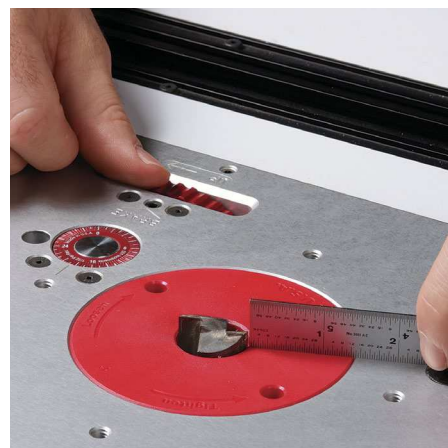
No matter what jobs you use your router table for—profiling edges, cutting rabbets and dadoes, or routing dovetails and box joints—there are two things that you end up doing a lot: changing bits and adjusting the bit's height. Both tasks can be exercises in frustration if your router table is nothing more than a router bolted to a flat surface (whether that surface is a router plate or a piece of plywood). To change the bit, you'll have to pull the router out from under the table and then put it back. And changing the bit's height can be even more aggravating, as it can involve a series of hit-or-miss adjustments as you reach under the table to unlock, raise or lower, and then re-lock the motor. The bit always seems to drop or climb just a hair when you lock the motor.

Even if you have a router designed for table use—which allows for above-the-table height adjustments—you still have to reach under the table to unlock the motor to make changes and then reach back under to relock it. And changing the bit can still require you to take the motor completely out of the table.

The solution to these problems is a router lift to hold your router's motor. With a lift, you can raise and lower the motor from above the table. Changing bit height is a snap, and you don't have to reach under the table to unlock and lock the motor. In fact, most lifts are so solid there is no need for a separate locking step. There is also enough vertical movement to get the collet above the table so you can change bits without removing the motor.

If you don't have a router lift, you should consider getting one. To save you from having to wade through discussion forums, YouTube videos, Amazon reviews, and countless pages of Google search results, we tested the lifts currently on the market. We got seven lifts into the shop and examined them side-by-side. We checked to see if they held their vertical alignment and kept the router square to the table, and how securely they held height adjustments during use. We also looked at a whole host of convenience features, such as how easy it is to adjust the bit's height and how quickly the lift plate's insert rings can be taken in and out (they need to be easy to remove and replace because it has to be done every time you change the bit—not only to gain wrench access to the collet, but also because bits are different sizes, so you'll need to switch out the insert rings to match.) All of the

Accuracy and convenience



Router lifts are all about convenience. The two things you do most when using a router table are changing bits (above) and adjusting the bit's height (left). Router lifts make your life easier, because they make it possible to do both jobs from above the table.

Setup is a snap

Unlike router plates, which must be bolted to the router base, router lifts have a carriage that holds the motor (right), a faster and more convenient way to mount the router. And look for insert rings that are easy to install and remove, like those that twist in with a spanner wrench (far right).



Router lifts, head to head



EXCALIBUR 40-125



Street price: \$370

The Excalibur is a rock-solid lift that's easy to adjust. The lift mechanism comprises four posts connected by a chain and sprockets. Height adjustments were precise, and the system stayed aligned and held its height settings perfectly. The insert rings twist and lock into place with a spanner wrench, a simple and effective system. They were level with the plate and easy to use. The lift is designed for large routers, but can accommodate smaller ones with the addition of a reducer sleeve that fits around the router's housing.



JESSEM ROUT-R-LIFT II



Street price: \$190

Designed for medium-size routers with 3½-in.-dia. motors, this lift has all of the features and accuracy of its bigger brethren, but in a slighter package. It's easy to install the motor, adjust bit height, and change bits. The insert rings were level with the lift plate, and twist into place with a spanner wrench. Once set, height and alignment were very stable. If you never plan to get a big router for your table, this is the lift to have.

router lifts performed well, but one of these lifts proved itself better than the rest, and another is the best option for those on a tight budget.

Excalibur is a cut above the rest

After completing all the tests, we determined that the Excalibur 40-125 is the Best Overall lift. It stayed aligned, held its height settings, and made height adjustments and bit changes a snap. The lift mechanism itself is stout, more than sturdy enough to handle the weight and power of a big 3-hp router. But it is also the most expensive lift in the test.

If you're looking for a more affordable lift that still does a great job, the Best Value JessEm Rout-R-Lift is for you. It's the least expensive lift we tested, but it held its vertical alignment especially well. However, the JessEm fits only medium-size router motors, like the Porter Cable 690, the Bosch 1617, and the DeWalt 610. □

Roland Johnson contributed to this article.

BENCH DOG 40-150



Street price: \$360

A cast-iron plate, accurate height adjustments, and a stout lift mechanism make this a great router lift. The crank handle is actually a speed wrench, which is nicer than the handles on the other lifts. However, it engages the lead screw by means of a shallow socket that slips over a nut on the screw. The fit between them allowed the wrench to wobble during use.

JESSEM MAST-R-LIFT II



Street price: \$360

This lift would be a great choice for someone with a medium-size router who is looking to upgrade to a big one later, because the clamping mechanism adjusts to fit just about any router motor on the market. Height adjustments are easy. The plate is easy to level and has adjustable “snuggers” to ensure that it fits tightly in the opening.

ROCKLER ROUTER LIFT FX



Street price: \$200

This is the lift for anyone who has just one router motor and plans to use it in both handheld and table modes. A nifty cam lock made quick work of taking the motor in and out. However, the lift fits only medium-size routers. Height adjustments were no problem. However, the throat insert is held in place by screws, and that's a hassle on a tool that is supposed to be all about convenience.

WOODPECKERS PRL-V2



Street price: \$350

A unique thumbwheel for fine height adjustments combined with a spring-loaded lift handle for quick and big changes results in a lift that's easy and quick to set up. The thumbwheel, which changes the bit's height $\frac{1}{32}$ in. with every full rotation, allows for finer adjustments than all the others, which adjust the height by $\frac{1}{16}$ in. with each rotation. And bit changes are lightning-fast. The throat insert twists and locks into place.

Go for the gusto: Buy the total package

Making a router table seems to be a rite of passage for woodworkers. But for many of us there is no good reason to do it. You might save some money, but you're going to spend a lot of time making it. Wouldn't you rather be building furniture than shop tools? And, to be blunt, it's tough to beat the factory when it comes to quality and features. So, if you're looking for your first router table or want to replace an existing one, consider getting a lift and manufactured table for the ultimate in speed and convenience.

We tested 10 router tables at the same time as these lifts (see pp. 58-61). You could mix and match many of these lifts with the tables, but there is no need. The Best Overall table and lift combination is the Excalibur 40-200C table paired with the Excalibur 40-125 lift. The cast-iron table has no sag, great dust collection, a fantastic fence, and a top-performing lift.

If that package is outside your budget, then you'll find a great value in the JessEm Rout-R-Lift II complete table system, which

EXCALIBUR 40-200C TABLE PAIRED WITH THE EXCALIBUR 40-125 LIFT

Street price: \$1,099



EDITORS' CHOICE

JESSEM ROUT-R-LIFT II COMPLETE TABLE SYSTEM

Street price: \$750

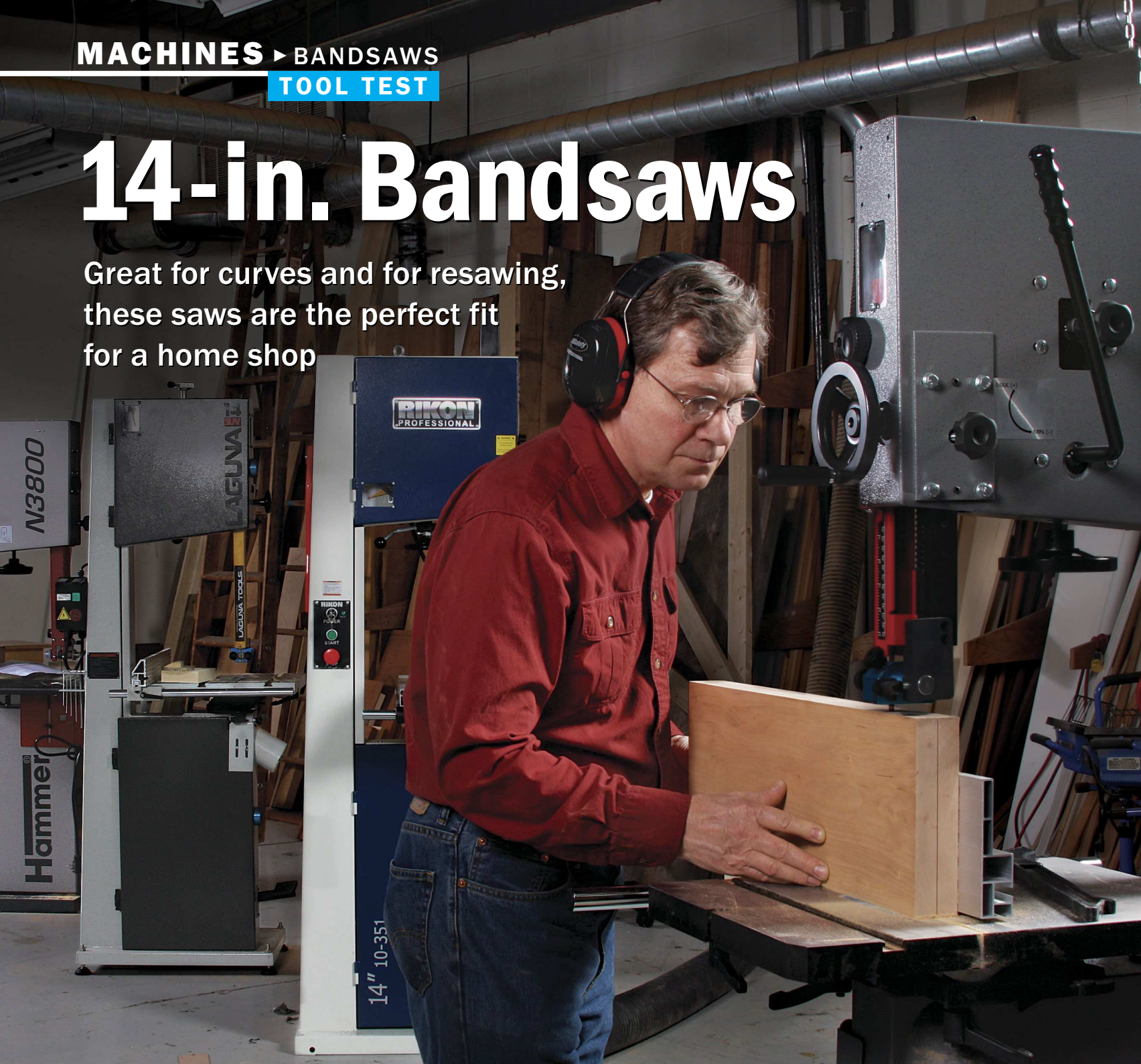


EDITORS' CHOICE

includes the lift, the Mast-R-Top, Rout-R-Fence, a sturdy stand, a power switch, and even some featherboards. You'll even save money on the router, because the lift fits only medium-size routers, like the Porter Cable 690, Bosch 1617, and DeWalt 610. Not only are they less expensive than routers with more horsepower, there's also a good chance you already have one and can use it in the table.

14-in. Bandsaws

Great for curves and for resawing, these saws are the perfect fit for a home shop



The bandsaw may be the most versatile machine in the shop. You can use it to cut curves and joinery, to rip boards (rough and milled), and to resaw. Bandsaws come in a range of sizes, from benchtop models to industrial giants. But the perfect size for many woodworkers is 14 in. It's the first bandsaw most of us should get, and could be the only one you'll ever need. A 14-in. bandsaw has a small footprint, so it fits easily in most home shops.

We've tested a lot of bandsaws over the years, and we've never found one that couldn't rip or cut curves. The real test is resawing wide boards, because it requires a lot of cutting height, a strong

motor, and a guide post that doesn't flex. So we tested only saws that can resaw boards at least 10 in. wide without the addition of a riser block, and that have motors of 1½ hp or more.

During the test, we cut curves, made ripcuts, resawed wide boards, changed the blade, and adjusted the guides. We also checked features such as dust collection and the fence, which have a direct impact on the saw's performance. Read on to see which saws made the cut, and which ones fell short.

Roland Johnson contributed to this article.

Packed with power and user-friendly features

After all of the tests were complete, two saws stood out. The Powermatic 1500 and Laguna 14/Twelve are both great saws, and earn Best Overall honors. The Laguna also is a Best Value, sharing that title with the least-expensive saw in the test, Steel City's 50155G.



EDITORS' CHOICE
BEST OVERALL

POWERMATIC PM1500

Street price: \$2,900

This is a great saw all around. All of the important adjustments are made without tools, and the guides can be set accurately with ease. Tracking the blade is simple, too, due to the window in the upper housing and yellow tires on the wheels. The 3-hp motor easily handled the resaw test—better than all of the other saws.



EDITORS' CHOICE
BEST OVERALL EDITORS' CHOICE
BEST VALUE

LAGUNA 14/TWELVE

Street price: \$1,097

The Laguna is full of smart features. No tools are needed to install a blade and adjust the guides. It has the largest throat of the saws tested, making blade changes much easier, and the aluminum throat plate has leveling screws. The guides are ceramic, a welcome feature on a saw in this price range. The motor is wired for 110 volts, a plus for those without access to a 220-volt circuit.



EDITORS' CHOICE
BEST VALUE

STEEL CITY 50155G

Street price: \$700

This saw does an excellent job resawing, and has very good dust collection. Although blade changes and guide adjustments aren't as easy as they are on the Powermatic and Laguna 14/Twelve, they aren't difficult either. The 1½-hp motor is wired for 110-volt power, so this saw can be used on a standard house circuit. The lamp and mobile base are convenient additions.

Details that make a difference

HASSLE-FREE BLADE CHANGES

Unless your bandsaw is dedicated to a single type of cut, say for resawing, you'll need to change blades. It should be easy to install blades, and then to tension and track them.



Quick-release tension speeds up blade changes. Most saws have a lever that releases or engages tension on the blade. Flip the lever and the tension releases instantly. Without it, blade changes take longer.



Guards shouldn't get in the way.

On the Oliver and General International (shown) saws, the blade slot pinches together at the top of the guard, making it difficult to install and remove the blade.



Window makes blade tracking easier. You can see when the blade is centered on the tire. The Hammer, both Laguna machines, and both Rikon saws have one. A light-colored tire, like the one on the Rikon 10-325 (shown), is a great aid, too.

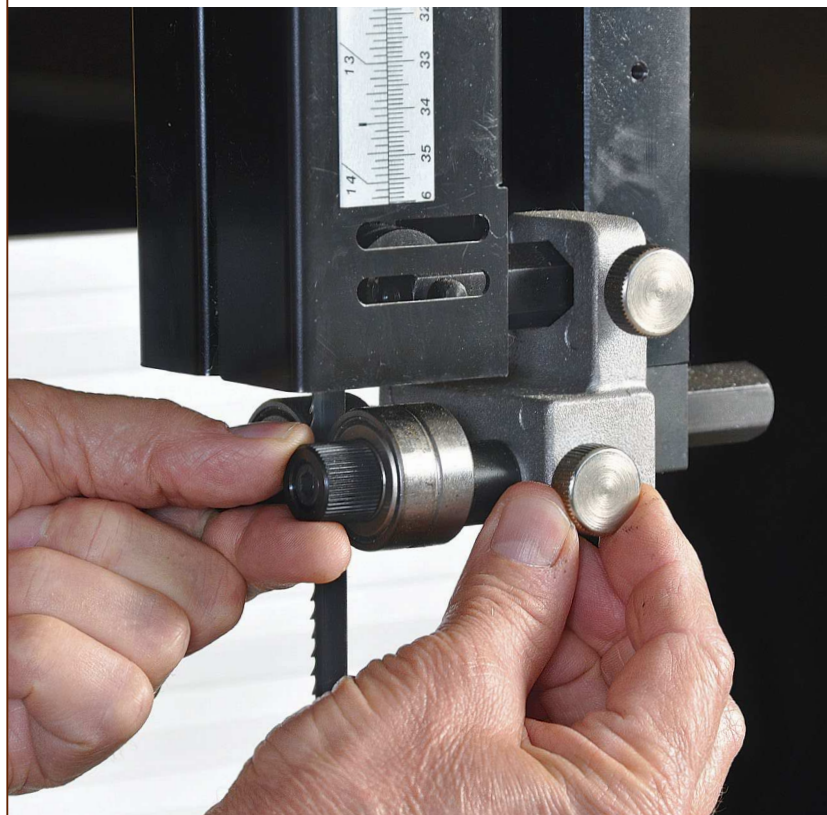


Article **Extra**

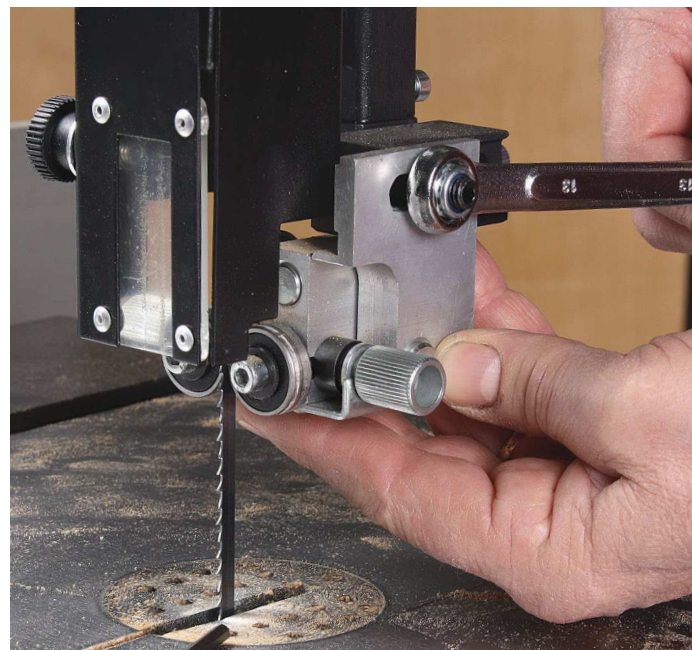
Watch a video on the right way to change a bandsaw blade.

GUIDES THAT ARE A SNAP TO ADJUST

Setting the blade guides should not be a frustrating experience. Toolless adjustments make it a quick and stress-free job.



Tool-free is the way to go. The guides on the Powermatic PM1500 were the easiest to set up and adjust.



Tools slow you down. The guides on the Laguna 14 SUV require two different wrenches (one box end, one Allen), making adjustments more cumbersome.



FENCES THAT RIP AND RESAW

Two-position fences are convenient, especially when they can be adjusted without tools.



Two-position fences are safer. No matter how tall the workpiece is, you can always get the guide bearings close to it with this type of fence. The lower position also provides plenty of clearance for your hand or a push stick.

GOOD DUST COLLECTION

Bandsaws create a lot of dust quickly, especially when resawing, and you need a well-placed dust port to catch it.

Under the table works best. It pulls in the dust as soon as it's made, and gets nearly all of it. The Rikon 10-351 (shown) and both Laguna saws have a port there.



Lower ports miss too much dust. Falling dust is able to escape the port's reach. Both the Grizzly (shown) and Hammer saws have low ports.

FOOT BRAKE SPEEDS UP THE WORK

The brake brings the wheels and blade to a halt within seconds, allowing you to begin your next cut more quickly. Without a brake, it can take 30 seconds or more for the wheels to stop spinning.



Stop it with a step. The foot-activated brake frees up both hands to control the workpiece. Five saws have a foot brake: General International, Hammer, Laguna 14 SUV (shown), Powermatic, and Rikon 10-351.

14-in. bandsaws compared

We tested the bandsaws by resawing 10-in.-wide cherry, and cutting curves in 1-in.-thick poplar. Along the way we evaluated the ease of changing blades, adjusting the guides, and using the fence. Each saw was equipped with its own pair of Carter bandsaw blades—one for resawing, one for curves.



General Int. 90-170B



Grizzly G0457



Hammer N3800



Jet JWBS-14SF

MODEL	STREET PRICE	MOTOR (HP)	RESAW CAPACITY	EASE OF BLADE CHANGES	EASE OF GUIDE ADJUSTMENTS	GUIDE-POST ALIGNMENT
General International 90-170B	\$1,595	1½	12 in.	Poor	Good	Fair
Grizzly G0457	\$1,050	2	10 in.	Good	Good	Very good
Hammer N3800	\$2,075	2	12¼ in.	Good	Good	Poor
Jet JWBS-14SF	\$1,600	1¾	13½ in.	Very good	Excellent	Good
Laguna 14 SUV	\$1,700	3	14 in.	Good	Good	Excellent
BEST OVERALL CHOICE BEST VALUE CHOICE Laguna 14/Twelve	\$1,097	1¾	12 in.	Very good	Very good	Excellent
Oliver 4620	\$1,403	1½	12 in.	Fair	Good	Good
BEST OVERALL CHOICE Powermatic PM1500	\$2,900	3	14 in.	Very good	Excellent	Very good
Rikon 10-325	\$1,000	1½	13 in.	Fair	Poor	Very good
Rikon 10-351	\$1,500	2½	14 in.	Good	Good	Good
Steel City 50114	\$700	1¾	12 in.	Poor	Fair	Poor
BEST VALUE CHOICE Steel City 50155G	\$700	1½	12 in.	Good	Good	Very good



Laguna 14 SUV



Oliver 4620



Rikon 10-325



Rikon 10-351



Steel City 50114

GUIDE-POST RIGIDITY	DUST COLLECTION	FENCE	RESAW CUTS	CURVE CUTS	COMMENTS
Very good	Very good	Very good	Good	Good	Stout upper guide post provides solid support for resawing. Foot brake stops blade quickly.
Good	Fair	Excellent	Very good	Very good	Great two-position fence changes over quickly. Table height is perfect for detail work. Base cabinet provides convenient storage for blades and gear.
Fair	Very good	Very good	Very good	Good	Guides are adjusted without tools. Blade guard slightly obscures view of the cut line. No quick-release tension lever.
Good	Very good	Excellent	Good	Good	Has a great two-position fence with an etched scale and micro-adjust knob.
Good	Excellent	Good	Excellent	Good	Huge throat plate makes it very easy to get blades in and out. Motor easily handles massive resaw capacity.
Good	Very good	Very good	Good	Very good	Excellent two-position fence, big table, and plenty of power.
Very good	Very good	Very good	Very good	Good	T-square fence has rollers for easy movement and T-slots in the fence rail for add-ons like a tall resaw fence.
Good	Good	Excellent	Excellent	Very good	Fence and guides are easy to adjust, and front brake stops the blade quickly. Every adjustment is made without tools.
Poor	Fair	Good	Good	Very good	Yellow tires and window in upper housing make blade tracking very easy. Base cabinet provides convenient place to store blades and gear. Includes lamp.
Fair	Excellent	Good	Very good	Very good	Tool-free blade-guide adjustments, big door on the blade guard, and unique blade tension lever make for quick blade changes. Includes LED light.
Poor	Poor	Poor	Fair	Good	Dust drawer in base catches dust that falls into cabinet. LED work light on upper cabinet is bright.
Good	Very good	Fair	Excellent	Fair	Includes casters for mobility, a circle-cutting jig, and a lamp. No quick-release tension lever.

Benchtop Mortisers

These tools cut square holes fast and easy

The mortise-and-tenon joint is strong, reliable, and versatile, suitable for tables, chairs, case-work, and more. Many woodworkers, however, find the mortise half of the joint to be a challenge. To cut it by hand you need only a chisel and mallet, but it takes time to learn the technique. Drilling or routing out the waste and then squaring up the walls with a chisel also works, but it, too, is time-consuming.

A better tool for the job is the hollow-chisel mortiser. The machine's head is fitted with a square, hollow chisel with a drill bit running through the center. As you plunge the chisel and bit into the

wood, the bit removes most of the waste, and the chisel squares up the hole.

Although mortisers come in a variety of sizes, a benchtop model will cut just about every mortise you'd need for furniture. Benchtop mortisers have enough power to plunge a chisel up to ½ in. square into hardwoods, and they cost significantly less than larger, floor-standing machines.

We tested the 13 benchtop models available to find out which performs the best and which is the Best Value.

Power, leverage, and ease of use

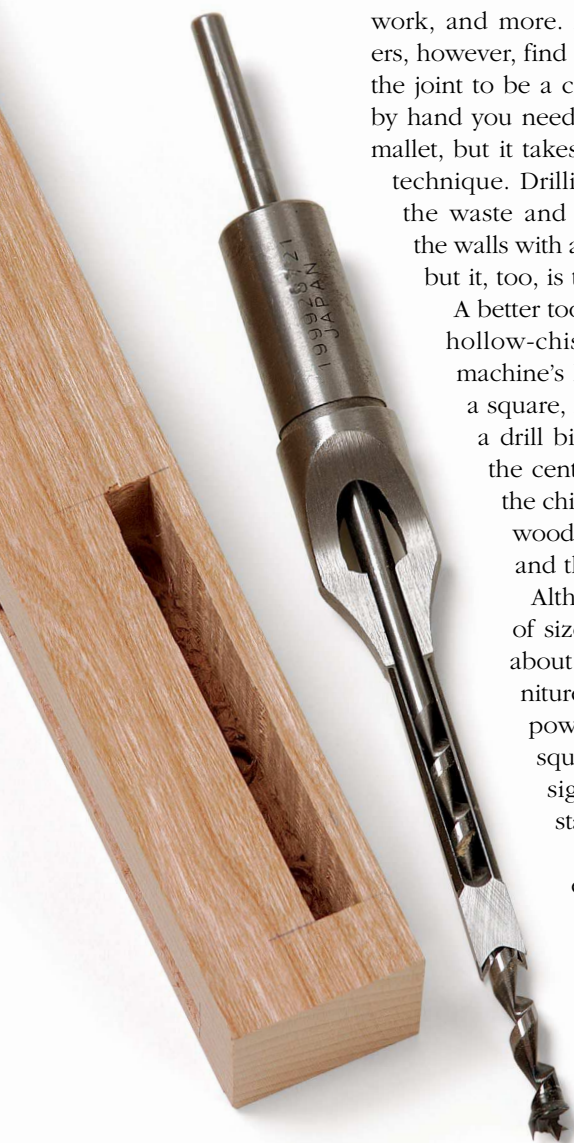
It's not easy to plunge a chisel and drill bit simultaneously

into wood, so a mortiser needs a strong motor, and a handle that creates leverage. We tested all of the machines with the same ½-in. bit from Charles Schmidt and Company (sharpened between machines). With models that have less than ¾ hp, you'll need to slow the feed rate in harder woods to keep the chisel and bit from clogging. However, most furniture mortises are between ¼ in. and ¾ in. wide, and all of the machines easily cut mortises in that range. For leverage, you want a longer handle that's easy to adjust.

Most important is how easy the mortiser is to use. Adjustments to the fence shouldn't require a tool. The depth stop should be quick to operate without tools. And the drill chuck should be easily accessible.

Two mortisers rise to the top

All of the machines tested, except for the one from Baileigh Industrial, are capable of cutting mortises accurately and maintaining their settings so that you





Make sure the fence is square. When you mortise a part, you press it against the fence with a clamp, rollers, or your hand. If the fence leans in or out, the mortise won't be square to the edge. All of the mortisers tested—except the Baileigh Industrial MC-625—had square fences.

can cut a series of identical mortises. However, the power and convenience of the Powermatic PM701 and General International 75-050T make them stand out.

The Powermatic has a powerful $\frac{3}{4}$ -hp motor, so it cuts quickly, even with a $\frac{1}{2}$ -in. chisel. It's also the most user-friendly. Every adjustment (except the drill chuck) is made without a tool, and the stop, fence, and hold-down moved smoothly and easily. The fence locks down with two cam levers. Access to the drill chuck is easy via a door that snaps open easily; inside, there's plenty of room for the chuck key and your hand.

The General International 75-050T is a great machine, too. The only mortiser in the test with a tilting head, it's the best choice for anyone who cuts angled mortises on a regular basis, like a chair maker. The head also rotates, so you can cut mortises on parts that wouldn't fit under the chisel otherwise.

The Wood River mortiser is the Best Value among these machines. It has a big table with extensions, rollers to hold parts against the fence, and you can reposition the lever with one hand.

Roland Johnson contributed to this article.

■ SQUARE FENCE THAT'S EASY TO USE

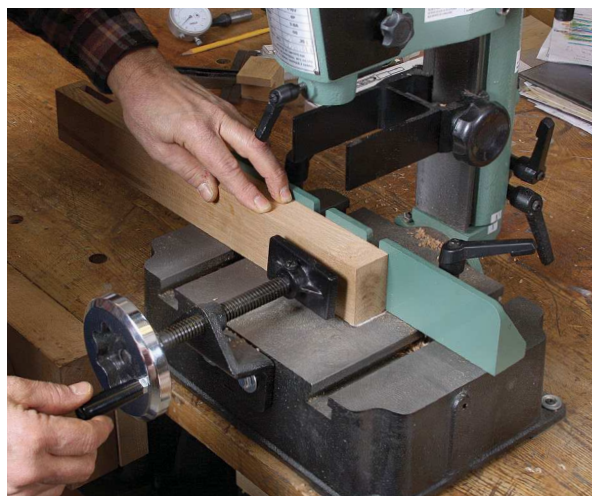
Every time you set up to cut a mortise, you have to adjust the fence, so it should be easy. Also, the fence must be square to the table to ensure accuracy. A convenient system to hold the work still is worth having, too.



Easy adjustments, in and out. On the Powermatic (shown), Delta, and Grizzly mortisers, the fence moves forward and back on a rack-and-pinion mechanism, making for quick and accurate adjustments.



Helping hands. It's nice to have help holding work against the fence. Rollers, like those on the General International 75-040 (top), work best, allowing you to move the part between plunges without loosening them. But a vise, like the one on the General International 75-050T (bottom), works, too. The downside is that you must loosen the vise to move the part between cuts.



CONVENIENCE IS KING FOR BIT CHANGES

The chucks on all of the machines tested are behind a door, so it should be a snap to open. And there should be plenty of space to get the chuck key in.



Wide open for business. The door on the Powermatic is the largest and easiest to open. This makes it very easy to lock bits in the chuck.



Thumbscrew is tedious. Having to completely remove a thumbscrew to gain access to the chuck, like on the General International 75-040, complicates bit changes.

READERS' RATINGS: BENCHTOP MORTISERS

Readers and editors both liked the Powermatic best. The Best Value Wood River didn't score as well with readers.

★★★★★	4.34	POWERMATIC PM701
★★★★★	4.00	BAILEIGH INDUSTRIAL MC-625
★★★★★	3.99	GENERAL INTERNATIONAL 75-050T
★★★★★	3.71	JET JBM-5
★★★★★	3.68	SHOP FOX W1671
★★★★★	3.67	RIKON 34-250
★★★★★	3.67	WOODTEK 138224
★★★★★	3.63	STEEL CITY 25200
★★★★★	3.56	GRIZZLY G0645
★★★★★	3.54	DELTA 14-651
★★★★★	3.50	GENERAL INTERNATIONAL 75-040
★★★★★	3.41	WOODTEK 876775
★★★★★	3.22	WOOD RIVER 151223

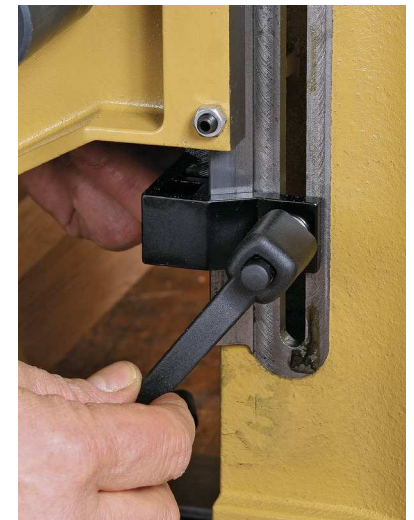
DEPTH STOP MUST BE DEAD-ON

A stop will prevent you from accidentally cutting a through-mortise. But more importantly, it guarantees that every cut is the same depth.



Two stops in one.

The bottom stop controls the depth of cut, and the top one allows the chisel to clear the part without having to raise the lever fully—a convenience featured only on the General International 75-050T.



Easy stop. A ratchet handle tightens the Powermatic's stop against the dovetailed ways. It was easy to adjust and tighten.



Article Extra

Learn how to sharpen a hollow chisel in a step-by-step video.

BIGGER TABLES ARE BETTER

A big table stabilizes the workpiece, so you can use both hands to adjust the mortiser's settings, and lessen the chance that the part will move during the cut.



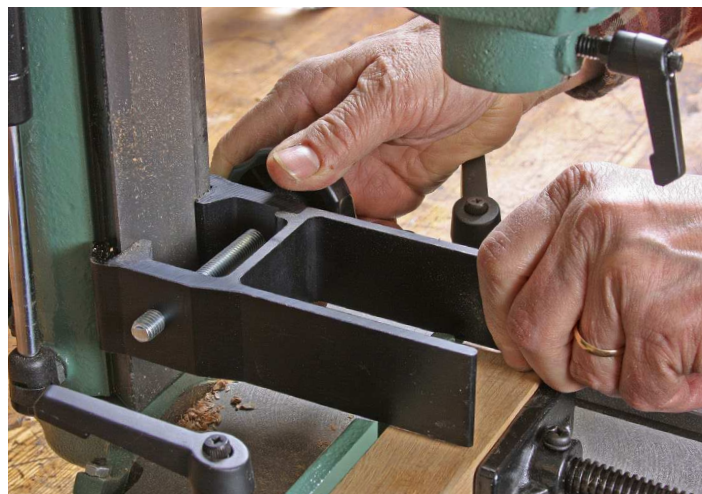
Extensions for long parts. The Wood River, General International 75-040, and Steel City machines have extensions that keep legs and other long parts level for setup and mortising.



Small table, big headache. Mortises are often near the end of a part, and on a small table like the one on the Woodtek 138224, the part will tip up. You have to keep a hand on it any time the clamp isn't tight against it, which can complicate setup.

HOLD-DOWNS MAKE WORK EASIER

When raised out of the cut, the chisel and bit can pull the part up off the table. A good hold-down prevents that.



Tighten in a flash. The large knob on the General International 75-050T is easy to turn, and always there, so adjustments are fast.



Keep the Allen wrench close by. Four machines (Shop Fox, Steel City, Wood River, Woodtek 876775) require the use of an Allen wrench to adjust the hold-down, an unnecessary complication.

ADJUSTABLE LEVER IS BEST

Sometimes the lever interferes with the cut. It might hit a wide or thick part before you cut to the mortise's final depth, for example. If you can reposition the lever on the fly, you can finish the cut.

Reposition with one hand. On the Steel City, Shop Fox, and Wood River machines, you need only tilt the lever out with your hand and then rotate it.



Limited options, and difficult changes. The levers on the machines from General International and Woodtek have two positions only, and require you to loosen a set screw before you can switch between them.

Benchtop mortisers

We tested the machines with the same 1/2-in. bit, sharpened between tests. All the machines were able to cut mortises adequately, but the best offer a combination of power and convenience that makes them stand out from the crowd.

**POWERMATIC
PM701**

EDITORS'
BEST OVERALL
CHOICE



**GENERAL
INTERNATIONAL
75-050T**

EDITORS'
BEST OVERALL
CHOICE



**WOOD RIVER
151223**

EDITORS'
BEST VALUE
CHOICE



**BAILEIGH IND.
MC-625**



**DELTA
14-651**



**GENERAL INTL.
75-040**



**GRIZZLY
G0645**



**JET
JBM-5**



**RIKON
34-250**



**SHOP FOX
W1671**



**STEEL CITY
25200**



**WOODTEK
138224**



**WOODTEK
876775**



	MODEL	STREET PRICE	MOTOR	HOLD-DOWN	CLAMPING	FENCE	TABLE	DEPTH STOP	COMMENTS
	Baileigh Industrial MC-625	\$355	½ hp	None	Good	Poor	Poor	Poor	Only mortiser with an X-Y table.
	Delta 14-651	\$320	½ hp	Good	None	Very good	Good	Good	Includes four chisels (¼ in., ⅝ in., ⅜ in., ½ in.).
	General International 75-040	\$530	½ hp	Good	Excellent	Very good	Excellent	Good	Includes four chisels (¼ in., ⅝ in., ⅜ in., ½ in.).
	General International 75-050T	\$630	½ hp	Excellent	Very good	Very good	Fair	Very good	Includes four chisels (¼ in., ⅝ in., ⅜ in., ½ in.); tilting head makes it ideal for chairmaking.
	Grizzly G0645	\$255	½ hp	Good	None	Very good	Very good	Good	Includes four chisels (¼ in., ⅝ in., ⅜ in., ½ in.).
	Jet JBM-5	\$355	½ hp	Good	None	Fair	Very good	Good	MDF table can be replaced with shopmade jigs or larger table.
 	Powermatic PM701	\$490	¾ hp	Excellent	Good	Very good	Very good	Very good	Every adjustment, except for drill chuck, can be made without a tool.
	Rikon 34-250	\$280	¾ hp	Good	None	Very good	Good	Good	Includes four chisels (¼ in., ⅝ in., ⅜ in., ½ in.).
	Shop Fox W1671	\$375	¾ hp	Good	None	Fair	Very good	Good	Includes three chisels (½ in., ⅝ in., ¾ in.).
	Steel City 25200	\$350	½ hp	Good	Good	Very good	Excellent	Good	Table extensions and rollers make mortising more convenient.
	Wood River 151223	\$290	½ hp	Good	Good	Very good	Excellent	Good	Includes four chisels (¼ in., ⅝ in., ⅜ in., ½ in.).
	Woodtek 138224	\$550	1 hp	Excellent	Very good	Good	Fair	Good	Long handle and big motor make mortising easy.
	Woodtek 876775	\$340	½ hp	Very good	None	Fair	Very good	Good	Includes five chisels (¼ in., ⅝ in., ⅜ in., ½ in., ¾ in.).

Three Small Nailers

Pin, brad, or finish—which one is right for you?

Small pneumatic nailers are great time and material savers for just about any task that you'd trust to a hammer and many others that you wouldn't, from split-free pinning of tiny moldings to securing millwork.

Pin nailers and brad nailers make terrific substitutes for clamps and are a great way to attach glue blocks, case backs, and other parts where the nails won't show. Woodworkers who don't use them on their furniture find nailers invaluable for building jigs and shop fixtures. These nailers, and the larger finish nailers, are also great tools to have around the house for trimwork and improvement projects.

Here's a look at what these tools can do and some of their key features.

A narrow nose is more accurate

As convenient as pneumatic nailers are, if you can't accurately position the nail, especially when fastening fussy moldings, you'll quickly return to using a hammer. With some nailers the protective rubber nose cover needs to be removed to place nails accurately. But without the cover, the concussion of the plunger can bounce the nailer, causing the metal tip to dig in, leaving a dent or scar

on the surface. Small nose covers with alignment marks cast into all four sides are the best.

Depth adjustment

With brad and finish nailers, adjustable depth of drive is essential. Moving between hardwood, softwood, and composite products creates a wide variety of material density, and an easy-to-adjust depth drive makes adjusting to the changes seamless. The goal is to get the



PIN NAILERS

Pin nailers drive 23-gauge fasteners so narrow that the nail holes often don't need to be filled. The pins are headless and don't offer much structural strength on their own, but they are great for holding moldings in place while glue dries, fastening small glass stop, or applying tiny moldings. Some pin nailers can handle pins up to 2 in. long, but applications calling for more than 1 in. or 1½ in. are rare.



Precise placement. Small applied moldings are tough to glue and clamp, but a pin nailer, with its tiny nosepiece, makes it easy to hold and fasten even the smallest moldings.





BRAD NAILERS

Brad nailers fire an 18-gauge fastener with a head on it for more holding power. It works well for securing smaller trim and face frames. The fastener offers moderate structural strength and leaves a small but visible nail hole that will likely need filling. The gun is still small and light enough to use in tight spaces.



FINISH NAILERS



These nailers handle 15-gauge and 16-gauge finish nails and are commonly used for installing baseboard, chair rail, door and window casings, crown molding, door frames, and more. The large nail holes definitely require filling, and the gun can get heavy with extended use. One option is to ditch the compressor and hose by using a cordless model.

Key features

AIR HANDLING



Air source and connection. Pin nailers and brad nailers don't need large amounts of air, so a small compressor like this one from Porter-Cable will serve nicely. A swivel hose connector on the gun (right) makes hose management much easier.



Steering and exhaust. Adjustable ports found on some guns (left) let you steer the exhaust away from you. Another design neatly incorporates the exhaust into the gun's handle (right).



head of the nail deep enough to allow a dab of putty to fill the hole but not so deep that the tool's plunger leaves a cross-bar mark on either side of the nail hole. Some nailers rely on adjusting the air pressure for depth of drive, a less-than-accurate method. The depth-of-drive adjustment simply moves the nosepiece for deeper or shallower penetration. Since pin nails are typically headless, depth-of-drive adjustments aren't critical on them.

SAFETY

Two systems. Most pin nailers employ a dual trigger system (below) to prevent accidental firing. On brad nailers, the safety guard must be engaged by pushing the nose of the tool against the workpiece.



Bounce fire

Bounce fire is a setting that allows the user to keep the trigger depressed and simply bounce the nose on the surface of the wood to deliver a nail. This is really useful when doing production nailing or when nailing in cupboard backs or putting together jigs where super-accurate placement isn't essential.

It is convenient to use a bounce-fire nail delivery when putting together jigs or installing trim pieces so you can rapidly fire the nails into place. What's not so convenient is accidentally double-firing a nail because you couldn't hold the gun solidly and the resulting bounce caused another nail to be fired. Some nailers offer a simple switch on the gun for moving from bounce-fire to single-fire, others require a mechanical change. The switch is a more convenient option.

Dry fire

When a nailer fires without setting a nail, it's called a dry fire. Dry-fire prevention is a helpful feature, particularly in pin nailers where it's often difficult to tell when the gun is shooting blanks (tiny head, little rebound). Most nailers have view ports on the side of the nail carriage with a bright color on the inside of the carriage that becomes visible through ports when the nail supply runs low. Still, if you forget to check the ammo supply, the result can be a few dry-fire nail holes. Having a dry-fire lockout is a huge advantage, particularly with pin nailers where adding more nail holes without any holding power is cosmetically undesirable.

MANAGING NAILS



A deep subject. All nailers are capable of driving their fasteners completely beneath the surface. It used to be that adjusting the depth of this “set” was a matter of adjusting air pressure at the compressor. Recent models let you adjust this at the tool, often with a simple thumbwheel like the one shown here.

Nail carriages

Angled nail carriages (sometimes called magazines) not only allow easier nail placement when dealing with tight confines but also provide a better line of sight because the bulky power head is not centered in the field of view.

Side loading carriages are the ticket for 18-gauge nails. They are easy to load, especially with short sticks of nails, and it's easy to identify the length of nail (simply open the carriage). Rear loading is the norm for finish nails (15 and 16 gauge) where the nail sticks are sturdier, but identifying the nail length can be a hassle (pull the spring-plunger, slide the nails to the back of the carriage to check the length, then reverse the procedure). □

Roland Johnson contributed to this article.



Time to reload? Nail carriages on all types of guns typically feature a view port to let the user see whether the onboard nail supply is running low. Styles range from small holes to longer slots and mostly open designs.

Going cordless



Get untethered. Cordless nailers have been around for a while but recent advances in battery technologies have made battery-powered nailers smaller and more efficient (far left). In some models, the battery works in conjunction with a gas cartridge (left). In others, it powers an internal flywheel or compressed air cylinder which fires the nail.

Handheld Sprayers

New generation makes the job easier and more affordable

It used to be that if you wanted to spray a finish with anything larger than a rattle can from the hardware store, you needed a dedicated air compressor or pump, lengthy hoses, and often finicky spray guns. Commercial finishing contractors still use these rigs, but for less-frequent users such as homeowners or small cabinet-shop owners, a new generation of self-contained handheld sprayers offers the perfect solution.

Early handheld units, many of which sneezed out a horrible finish, were often sworn at by their owners and then chucked in the trash. They have been replaced with models that spray perfectly

smooth coats of a variety of finishes, then clean up easily. Prices vary, but the least-expensive models don't cost much more than a set of high-quality paintbrushes.

Sprayer types

Like larger sprayers, handheld units move liquid finish onto a surface in one of two ways: airless spraying or HVLP.

Airless sprayers use high pressure to pump finish through a small hole at the gun's nozzle, causing the finish to speed up and break into smaller particles. On an HVLP (high volume low



Airless sprayers for paint. These sprayers use a pump to force large volumes of finish through the nozzle. Graco's backpack version allows the user to carry a large reservoir of paint, minimizing refill stops.



**AIRLESS
SPRAYERS
HANDLE
BIG JOBS**

With cord or without.
A lithium-ion battery pack makes the sprayer even more portable.

HVLP SPRAYERS DELIVER A FINER FINISH



HVLP for stains and clear finishes. Units like the Wagner Flexio 590 (above) use an on-board turbine to mix the finish with forced air as it exits the nozzle, making a finer spray and the smoother finish needed for furniture and other projects (below).

pressure) sprayer, the pump pushes just enough air into a cup filled with finish or paint to force it out through the gun. Most of the air exits through the gun, too, from an array of holes that surround the center spray hole. This atomizes the finish into superfine particles.

An airless sprayer moves a lot more finish, but HVLP guns offer better control and greater transfer efficiency—a measurement of how much finish actually adheres to the surface. HVLP is best for interiors and finer work. Typically, airless sprayers are used for outdoor work, where you want to apply a lot of finish fast and don't mind getting some on the shrubbery. Higher pressure and larger output make airless sprayers better with thicker coatings like latex paints, but they also mean that an airless sprayer might not put down as fine a finish as an HVLP. Clear finishes like varnishes and sealers are easy to spray with any handheld.

Cups, cleaning, and noise

Handheld sprayers typically hold paint in a cup underneath the nozzle. A large cup needs fewer refills but weighs more. A lighter cup can make it easier to hold the gun parallel to the surface for the best finish. As to maintenance, it takes a little longer to clean an airless model, most of which also need occasional lubrication.

Some older handheld airless sprayers are not-so-fondly called “buzzguns” because of the racket they make. Ryobi marketing manager Jason Swanson says newer guns use a piston pump instead of a diaphragm type, producing “half the noise of our older models.” Still, an airless unit's buzz will be louder than an HVLP's rattling hiss. No matter which sprayer you use, you probably want to wear hearing protection, if only to keep paint out of your ears. □

Jefferson Kolle contributed to this article.



Builder's Squares

Get the right angle on these useful layout and measuring tools

Right angles are the reference point for most of what we build. Even circles and curves are calculated using them. And most measurements and layouts begin at a square corner. That's why the edges of most builder's squares are delineated in inches. In fact, in everyday use, most squares are used less to check corners and more as tools for layout and measurement. Some are even used as saw guides to ensure the cutting of perfectly square corners.

Taking true measure

Companies use lasers or a stable granite machinist's block to check their squares for accuracy during and again after manufacturing. All abide by a standard, whether it's a self-imposed in-house one or one from a standards laboratory. But keep in mind that the standard is an indication of

what's acceptable as a deviation from perfect, which suggests that perfection is unattainable.

That's what Richard Hummel thinks. The owner of Woodpeckers Inc., a manufacturer of high-quality woodworking tools including several squares, he says "true square doesn't exist." But that doesn't mean companies don't strive for it. Hummel's standard is to use a 0.0015-in. feeler gauge to check his squares before they leave the factory. "That's something that just can't happen in a factory that makes a quarter of a million squares every year," he adds.

Stanley's Premium Aluminum Rafter Squares are stamped with a die and require no milling afterward. Tom Chang, Stanley's global product manager for measurement and layout tools, says the company uses a laser gauge to check random tools in each manufacturing lot. If a sample tool is substandard, the die can be adjusted and the defective batch of squares is recycled. "Our job is to produce tools that are accurate while maintaining a price in the market and allowing us to stay in business," Chang says.

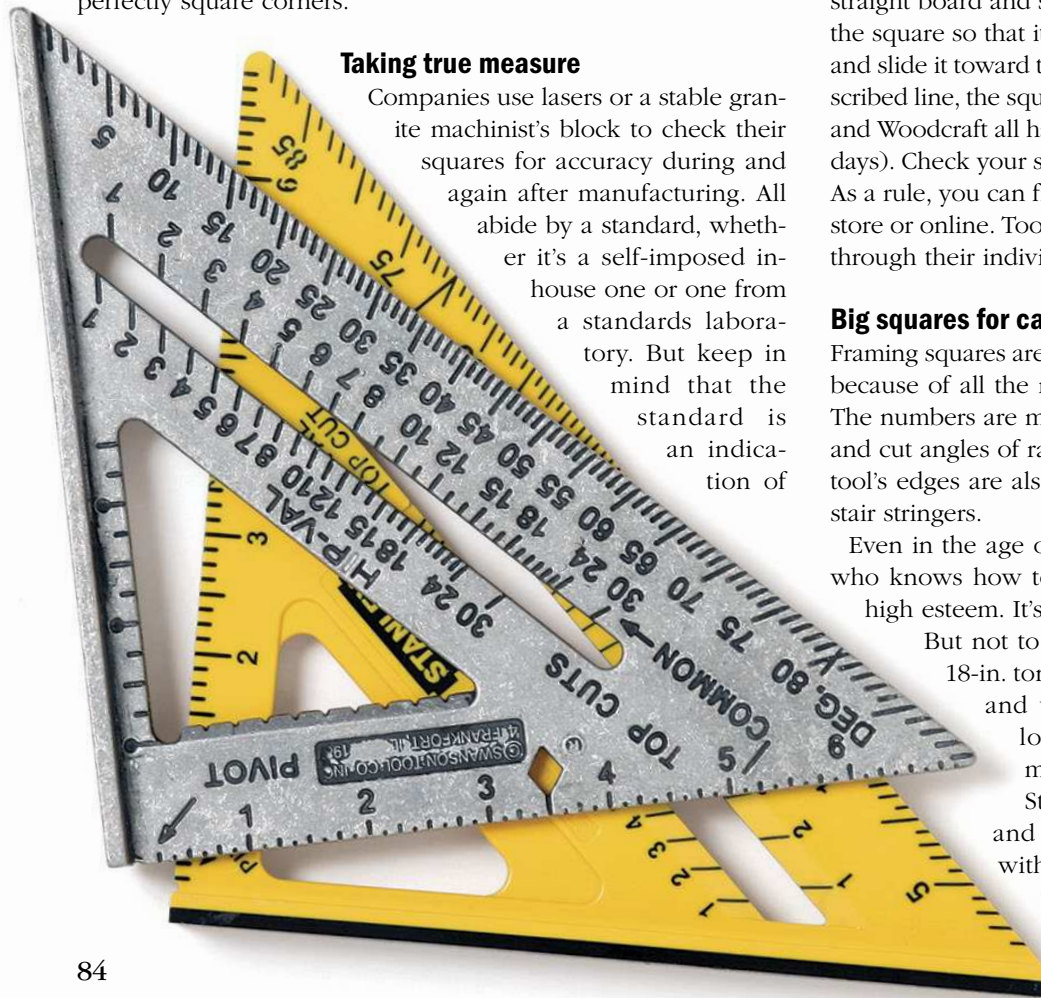
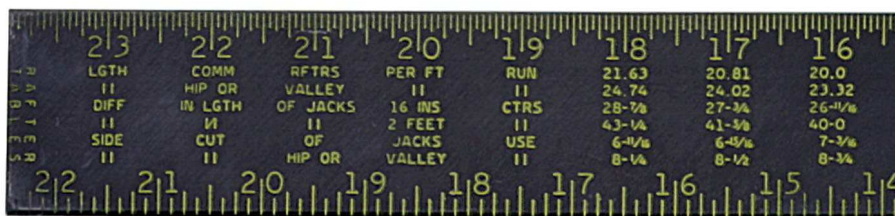
The easiest way to check a square yourself is to hold it against a straight board and scribe a line across the board's face. Then flip the square so that it rests against the board in the other direction and slide it toward the line. If the edge of the tool is parallel to the scribed line, the square is square. Rockler, Swanson, Garrett Wade, and Woodcraft all have a 90-day return policy (Woodpecker's is 30 days). Check your square when you get it, and return it if it's bad. As a rule, you can find a good variety of squares at any hardware store or online. Tools from specialty makers may be easier to find through their individual company websites.

Big squares for carpenters

Framing squares are daunting, not only for their sheer size but also because of all the numbers and tables etched along both sides. The numbers are multipliers and degree-readings for the lengths and cut angles of rafters and blocking. The inch scales along the tool's edges are also used for simple layout and for figuring out stair stringers.

Even in the age of electronic builder's calculators, a carpenter who knows how to calculate with a framing square is held in high esteem. It's getting to be a lost craft.

But not to everyone. Chappell's Master Framer has an 18-in. tongue that provides room for even more tables and works as a 3-4-5 triangle with the 24-in.-long blade. You can download the 48-page manual at chappellsquare.com. Stanley, Starrett, Johnson Level and Tool, Irwin tools, and others also make framing squares, replete with rafter tables. With some exceptions, expect to pay \$15 to \$20.



Framing square

This square combines a 16-in. by 1½-in. tongue and a 24-in. by 2-in. blade with plenty of room for scales. The reverse side includes a scale that divides inches into twelfths to simplify equations in feet and inches.

Rafter table

Six lines of figures aimed at helping roofers determine the length of rafters for various roof pitches, and the angles of the cuts needed to create them.

Blade

Heel

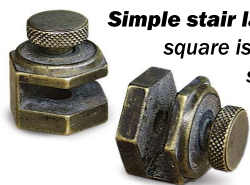
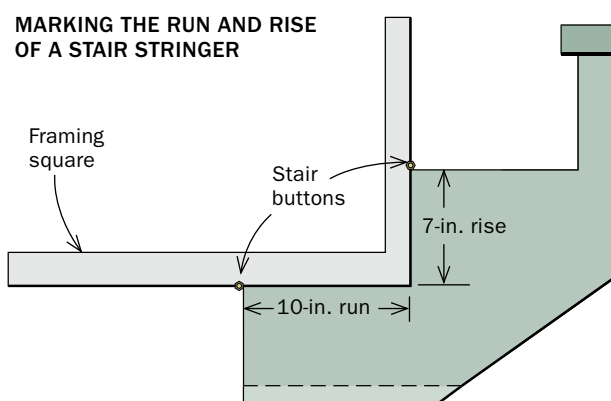
Tongue

Octagon scale

Used to lay out octagons.



MARKING THE RUN AND RISE OF A STAIR STRINGER



Simple stair layout. One common use for a framing square is laying out cuts for stair stringers. The settings for rise and run can be maintained with accessory clamps called stair buttons.



The home-grown approach. A straight board and a pair of spring clamps can do the same job as store-bought buttons.



Useful in the shop, too. The framing square's size makes it useful for laying out cuts on panels or checking case assemblies for square during glue-up.

High-end square. The U.S.-made Chappell Master Framers (model No. 1824) is guaranteed to be square within 0.003 in. along its 18-in. length.

The 304 stainless-steel square is cut with a laser, milled on a CNC machine and by hand, and costs \$118.

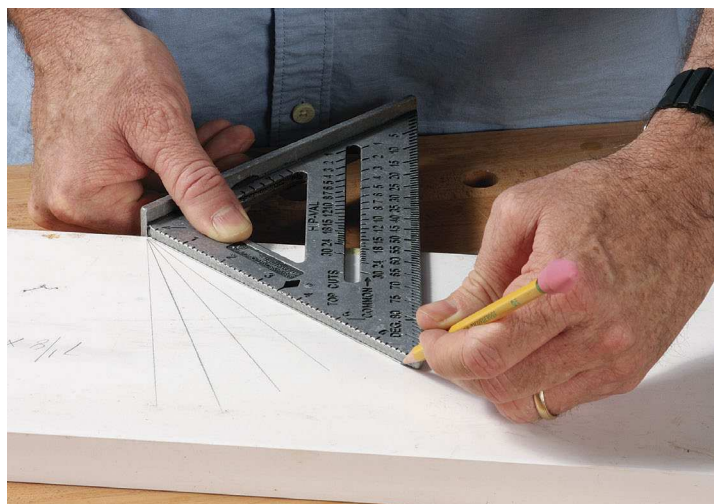


Speed Square

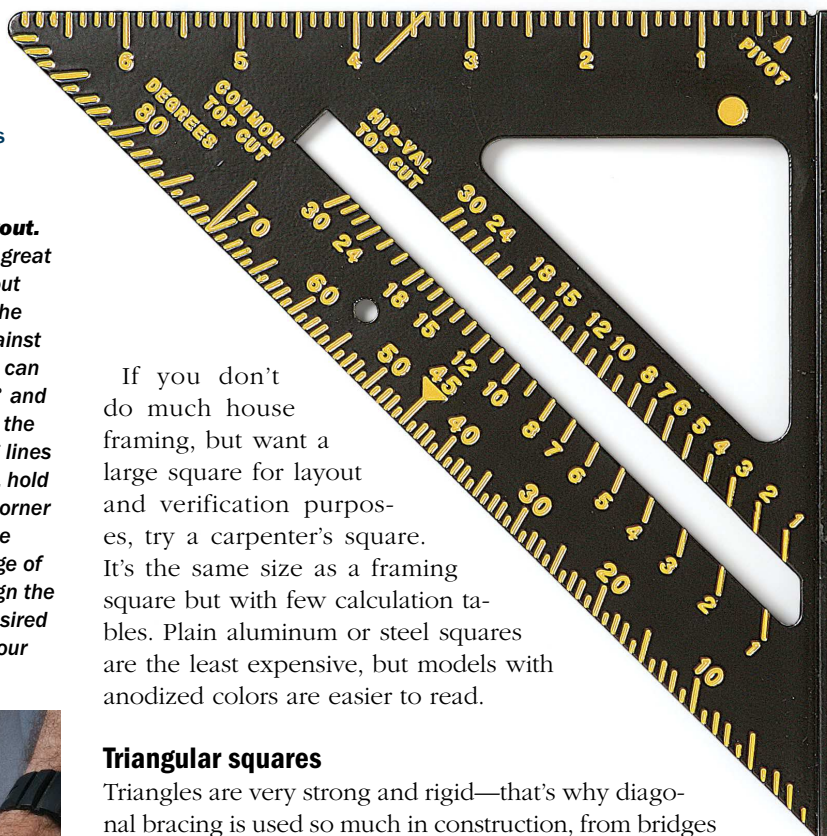
This triangular square is in tool belts across the country due to its compact size and indestructible utility. It's graduated in inches with other delineations for figuring out rafter cuts.



Speedy angle layout. A Speed Square is great for quickly laying out angled cuts. With the reference edge against the stock, the user can quickly lay out 90° and 45° cuts. To orient the square for scribing lines at different angles, hold the square's 90° corner as a fixed reference point along the edge of the stock. Then align the marking for the desired angle, and strike your line (below).



Saw guide. The Speed Square's easy handling and positive reference make it an ideal straightedge for guiding a circular saw for short crosscuts.



If you don't do much house framing, but want a large square for layout and verification purposes, try a carpenter's square. It's the same size as a framing square but with few calculation tables. Plain aluminum or steel squares are the least expensive, but models with anodized colors are easier to read.

Triangular squares

Triangles are very strong and rigid—that's why diagonal bracing is used so much in construction, from bridges to bridge tables. Drop any two-armed square on a scaffolding enough times and it's going to get knocked out of square, but a triangular square will stay true forever. Albert J. Swanson, a Chicago carpenter, knew this, and that's what led him in 1928 to make his triangular square. The Swanson Speed Square is made from 1/8-in.-thick die-cast aluminum. The edges are machined and then the tools go through a mechanical tumbling process to clean up any casting flash. The tool forms a right triangle with 7-in. legs. The hypotenuse can be used for marking 45° angles.

Along with their use as layout tools, triangular squares get used a lot as guides for circular saws. The tool is comfortable to hold one-handed against a board's edge.

Swanson makes variations of the original Speed Square, including a 12-in.-long model and plastic composite models that won't mar softer materials, such as vinyl siding. Stanley makes a version of the Speed Square, called the Quick Square, from black metal with bright yellow markings, as well as several plastic versions.

Triangular squares are used mainly for carpentry work and don't often find their way into a cabinet shop, except for rough preliminary work. Expect to pay around \$10.

Tri squares are not triangular

The story goes that the tri square was originally called a try square, used to "try" or test an angle for squareness. Tri squares have two parts: the thicker stock and the thinner blade, mounted at the end of the stock and forming a 90° angle.

Traditionally, a tri-square stock is made from wood, often a fine, stable hardwood and often banded or edged with steel or brass. Some tri squares have layout graduations marked on the blade, but traditional tools have unadorned surfaces.

A machinist's or engineer's square is similar to a tri square, except that the stock is made from metal. While it can be used for lay-

Other squares

A handful of other squares are also useful to builders and woodworkers alike as tools for reference and layout.



COMBO SQUARE

A 12-in. combination square can be used as a long- or short-bladed tri square as well as a miter square. Used with a pencil, it can scribe lines parallel to a board's edge.

out work, machinist squares are just as often used for setting tools and jigs and verifying, for instance, that a saw fence is square to its table. Machinist squares are sold in a huge variety of sizes. Garrett Wade offers a set of engineer's squares (with 2-, 3-, 4-, and 6-in. blades) in a wooden box. And Woodpeckers sells all-metal stock-and-blade squares in sizes from the smallest with its 2 $\frac{5}{8}$ -in. blade all the way up to its giant 16-by-24-in. Precision Woodworking Square.

Where to draw the line

If you spend more money on a square, you're more likely to find one that is precise and true to its name, but then again, you could find an inexpensive tool at the hardware store that is just as correct.

Hummel's advice is to consider the work you do and make a one-time tool purchase. That's what he does. And whether it's the work he's doing or the tool he's buying, his guiding principle is that both should be a "smidge better than they need to be." □

Jefferson Kolle contributed to this article.



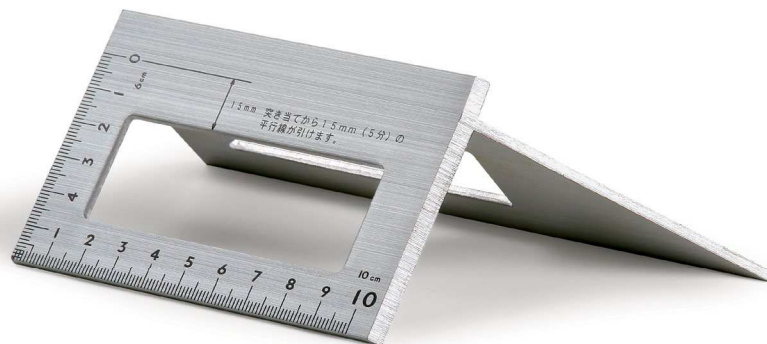
ENGINEER'S SQUARE

Similar to a tri square, this square is great for layout, and for setting up or checking machinery blades, fences, and tables for accuracy.



SADDLE SQUARE

This design from Shinwa provides broad references on two adjacent surfaces, letting the user easily carry a layout line from one surface to another.



Every Woodworker Needs a Tape Measure

How to get the most from this trusty tool

The tape measure is largely a contractor's tool, but every woodworker needs at least one. It travels to the lumberyard and stays in a pocket for a host of tasks around the shop, from rough layout to setting up machines for milling lumber. It has endless possible uses—and there are a few tips and tricks that will help you make the most of it.

It's hard to count all the ways to use a tape, but the first is at the lumberyard when checking stock against a cutlist. At home, it is used to lay out parts, marking rough lengths and widths with a lumber crayon. You'll use it at the chopsaw, when cutting those boards to rough length, and at the bandsaw when ripping them to



Roughing out parts

Fast layout.

When using a tape to lay out parts for a project, you can quickly see which parts can come from which board.



And fast machine setup. When you rough those parts out of a large board, a tape is great for setting your bandsaw fence, for example.



TIP

CHOP QUICKER



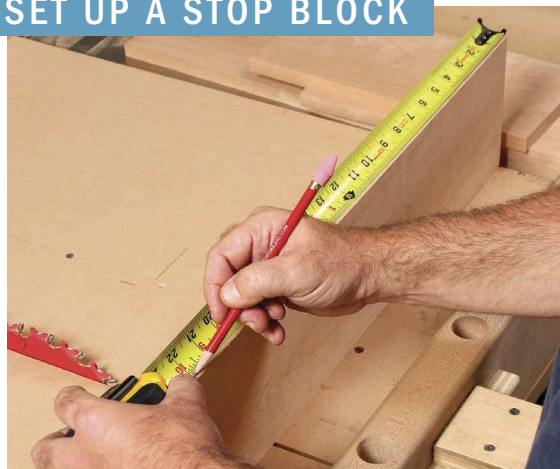
No mark needed on the miter saw. With the tape hooked on the end of the workpiece, just align the blade with your desired measurement (without turning the saw on). Hold the workpiece tight against the fence.



Hold and cut. Keep the workpiece firmly in place as you retract the tape, and then bring down the blade to make the cut.

Precise work, too

SET UP A STOP BLOCK



Matching parts. A tape measure can do more than rough work. To cut two case sides the same length, for example, square one end of the workpiece, then hook your tape on that end and make a tick mark (left). Use that tick mark to set up a stop (above)—in this case, a hook-shaped stop—and cut both parts precisely with one setup.

rough width. Later, as a piece develops (and you need to build doors and drawers to fit, for example), you'll use a tape to grab measurements and lay out rough stock. But rough work isn't the only reason to reach for a tape. If you know that your tape is accurate (see p. 91), you can use it to lay out joinery on big pieces, such as dados in bookcase sides. You can trust it for machine setups, too—especially for measurements that are too big for a combo square, like when working with plywood, or setting up a stop block in a crosscut sled. Even an accurate tape can't replace stop blocks or a story stick when they're called for, but you want a tape you trust, so you can use it to set up those stop blocks in the first place.

Tricks of the trade

Here are a few of our favorite tape tricks. They may not be amazing, but they're handy.

When you need to be precise, pivot the tape so that one side is lying down flat on the work. There are times you need to measure from one mark to another and the hook becomes a liability; it's much more accurate to measure from a line somewhere along the tape. You could start at the 1-in. mark, but after forgetting to add that inch back in a couple of times—with disastrous results—we've found it's better to start from the 10-in. mark. It's an adjustment that's too big to forget.

Then there is the trick at the chopsaw (or miter saw), where you bring the blade down onto the tape and board at the same time to line up a measurement. Just slide the tape away and keep the board in place for an accurate cut—without stopping to make a mark. Finally, you can use your tape during assembly to measure diagonals to check for square. The tape is perfect for this task—you can slip it under clamps, hook it over outside corners, and nestle it into inside corners.

Asa Christiana contributed to this article.

TIP

**10-IN.
TRICK**



Measuring from mark to mark. If you start at the 1- or 2-in. mark when measuring from one pencil mark to another, you might forget to subtract that amount from your measurement. Start at 10 in. instead. That amount is hard to forget.

ASSEMBLY



Best tool for checking diagonals. When you glue up a case piece, it's important to measure the diagonals to check that it's square. A tape threads around clamps and cauls so you can make those measurements quickly and easily.

Choosing a tape: Our favorites are small and accurate

With all the bells and whistles available on measuring tapes these days, the most important feature is still accuracy. Good news: After testing every tape measure we could get our hands on, we found that the most accurate, most convenient tapes tend to be among the least expensive.

Manufacturers are always looking to build a better mousetrap. But most of the innovations that have come along—winged hooks, and extrawide tapes that can span long distances without drooping, for example—benefit contractors more than woodworkers. Likewise, the big, fat 24-ft. tapes and beyond are overkill for the woodshop. The perfect tape for woodworking is 16 ft., longer than the longest boards you find at the lumberyard but small enough to carry easily. You might get away with a 12-footer, but it's a good idea to avoid pulling a tape measure out to its limit, since it puts stress on the reel inside and can shorten a tape's life.

A great woodworking tape does just a few things very well. For one, it's accurate

on the inside and outside of the hook, especially when tipped on its side to get the markings close to the work. (The big, winged hooks on contractor tapes often prevent the tape from lying on edge.) The hook should be easy to snag on the end of a board, the lock should move smoothly and hold fast, and the marks and numbers should be easy to read. Tapes that read from right to left are much easier for righties than the traditional left-to-right tapes, as the easiest marking position is with the tape in your left hand, hooked on the right end of the work. We tried every tape we could find, and our favorites are among the least expensive. That means you can afford to keep a few lying around the shop.

We like a standard locking mechanism that locks only when you flick the switch, and stays locked until you flick it back. We avoid the ones that slide freely only when you actively hold the release button, because that lever gets in the way when you quickly hook and pull.

READERS' RATINGS: TAPE MEASURES

The Lee Valley tape was tied with the Starrett Exact for the readers' favorite.

★★★★☆	4.38	LEE VALLEY 12 FT. BLINDMAN'S TAPE
★★★★☆	4.38	STARRETT EXACT 16 FT. TX34-16
★★★★☆	4.04	STANLEY FATMAX 16 FT. 33-716
★★★★☆	3.97	STANLEY POWERLOCK 16 FT. 33-116
★★★★☆	3.84	STANLEY 16 FT. 30-495

There are new tapes that lie flat and are made for woodworkers, but since you'll frequently use a tape to measure things that are out of reach, like the end of a 12-ft. board or the opposite corner of case piece, we prefer the traditional type that has the ability to support itself in midair.

All these features are useless, though, if the tape is not accurate. Fortunately, you can check its accuracy before you buy (see opposite page).

STANLEY 16 FT.

No. 30-495; \$8.50

This tape was accurate, inside and outside, and the price is unbeatable. The first 12 in. of graduations are $\frac{1}{32}$ in., and $\frac{1}{16}$ in. after that. The angled hook makes it easy to turn on its side for inside measurements.

STANLEY POWERLOCK 16 FT.

No. 33-116; \$9

This metal-cased Stanley has a smoother lock than its yellow plastic cousin, and a protective coating added to the tape itself, but otherwise, they're the same. Our tester owns two, and they're both dead-on accurate.

STANLEY FATMAX 16 FT.

No. 33-716; \$16

This extrawide tape is our favorite among the Stanleys. It's chunky, but the $\frac{1}{16}$ -in. markings are easy to read, even upside down. The hook is solid, offering more support when you angle the tape sideways.

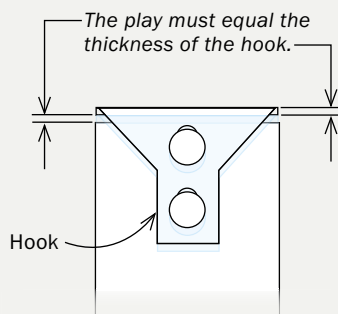


Does your tape measure up?

A tape measure should give accurate readings for both inside and outside measurements. Since quality can vary from one tape to the next, use a steel rule to check it for accuracy before you buy it.

PURPOSEFUL SLOP

The hook on the end of a tape measure wiggles for a reason, allowing precise measurements whether the hook is pushed or pulled.



Check the outside reading. When you're in the store, grab a good steel ruler off the shelf, hook the tape on the end, and verify that the lines match.

And the inside. Push the ruler and the tape against a stationary object to check whether the inch lines match when taking an inside measurement.

LEE VALLEY 12 FT.

Blindman's Tape; \$8

This is the only right-to-left reading tape on the list—a great feature (L-R is available too). The giant numbers are easy to read, and each mark comes to a sharp point, so accuracy is not sacrificed for readability.



STARRETT EXACT 16-FT.

No. TX34-16; \$9

This is a great tape for woodworking, with dead-on accurate readings in any position, a matte finish that reads well in any light, and $\frac{1}{16}$ -in. marks all the way to the hook. The first foot has $\frac{1}{32}$ -in. marks, too.

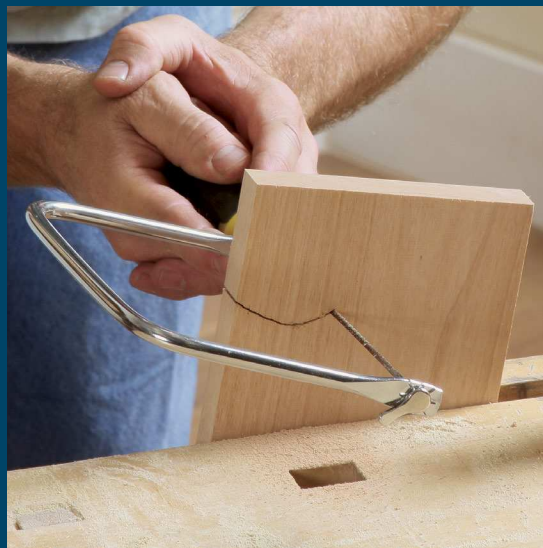


Coping Saws

Cut curves, cope molding, and speed up your dovetails with this simple saw

VERSATILITY IN A SMALL PACKAGE

With a coping saw, you can quickly get rid of the waste between dovetails (above). The saw's narrow blade also makes it a great tool for cutting curves, like those on a bracket foot (right). And then there's the job it's named for, coping moldings, which it does better than any other tool (far right).



Coping saws can be used to remove waste in joinery, make cope cuts on molding, and saw tight curves of all kinds. Motorized bandsaws and scrollsaws perform similar tasks, but require the workpiece to be brought to the tool, a task that can be difficult, awkward, or even impossible. More often than not it's more convenient to take the tool to the workpiece. This makes the coping saw an indispensable tool in the woodshop and the job site, serving an essential and useful function that cannot be matched by machine tools.

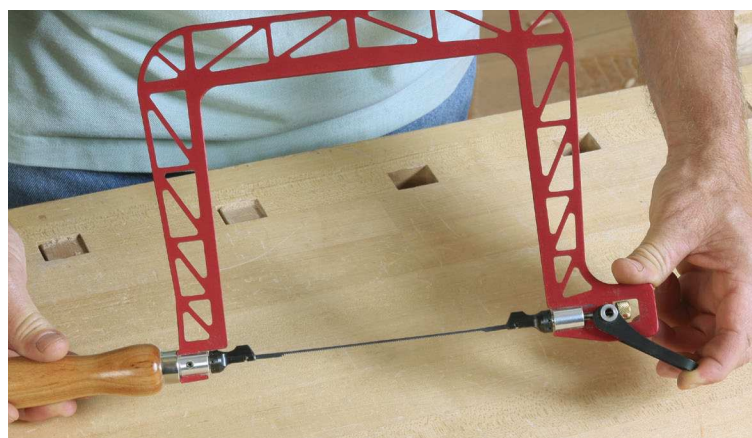
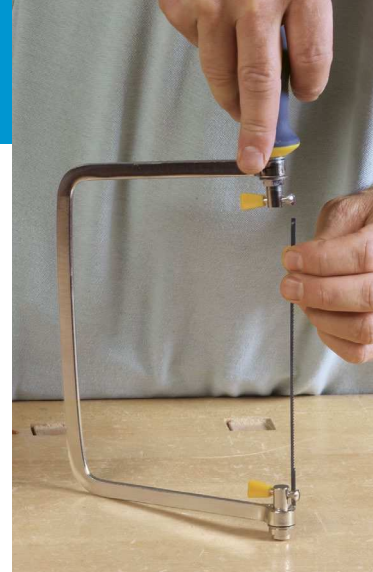
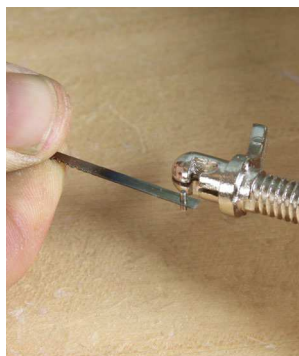
This review considers the 13 coping saws we found on the market. These are simple tools, consisting of a handle, a blade, and a frame. But despite the simple nature of these saws, there is a significant variation in the design and features offered. Regardless of their differences, we evaluated the saws on their critical features: the throat's depth; how easy it is to install, tension, and rotate the blade; and the saw's weight and overall ergonomics.

We also used the saws to remove waste between dovetails, cope a crown molding, and cut a curvy bracket foot. In addition

What to look for in a saw

EASY BLADE INSTALLATION

With most saws, flex the frame to install the blade. The blade has a pin on each end. The pins fit into sockets on the frame (right), and prevent it from slipping during use. To install the blade, put the pin in the outside socket, then push down on the handle to engage the pin in the inside socket (far right).



One-of-a-kind features. Only the Knew Concepts saw has a quick-release lever that makes for fast blade changes. A knurled knob just behind the lever easily adjusts the blade's tension.

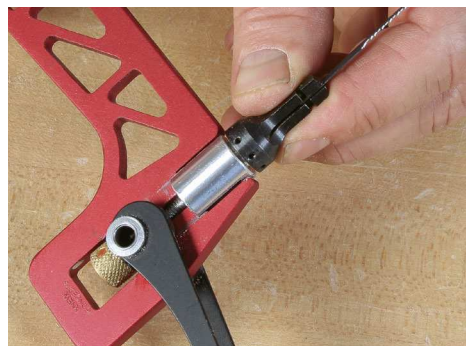
READERS' RATINGS: COPING SAWS

Both readers and editors loved the Knew Concepts saw.

★★★★★	4.68	KNEW CONCEPTS
★★★★☆	4.41	GRAMERCY TOOLS 12-IN. BOWSAW
★★★★☆	4.25	TEKTON 6865
★★★★☆	4.20	CENTURY DRILL AND TOOL 4940
★★★★☆	4.14	GARRET WADE MULTI-FUNCTION COPING SAW
★★★★☆	4.13	ROBERT LARSON 540-2000
★★★★☆	4.10	LEE VALLEY
★★★★☆	3.59	ECLIPSE 70-CP1R
★★★★☆	3.53	STANLEY FAT MAX 15-106
★★★★☆	3.52	OLSON
★★★★☆	3.51	STANLEY FAT MAX 15-104
★★★★☆	3.49	IRWIN 2014400
★★★★☆	3.44	BAHCO 301

FAST, PRECISE ROTATION

Navigating curves. To get around tight corners, you can rotate the blade of the coping saw. Detents are a common way to keep the blade's settings. Many saws have one every 45°.



An improved twist on detents. Knew Concepts uses a rotating blade clamp with holes every 15° that fit over a pin to lock in blade angles.



Inconvenient adjustment. To change angles on the Irwin saw, you must loosen and retighten the blade, which requires a wrench.

Coping saws put to the test



BAHCO



CENTURY
DRILL AND
TOOL



ECLIPSE



GARRETT
WADE



GRAMERCY
TOOLS
12-IN.
BOWSAW



IRWIN



OLSON



ROBERT
LARSON



STANLEY
FAT MAX
15-104



STANLEY
FAT MAX
15-106



TEKTON

LEE VALLEY



to these tests, we measured the amount of blade deflection. Most of the saws showed less than 0.2 in. of deflection, meaning blade tension wasn't an issue during cuts. However, those saws with blades that deflected more than 0.28 in. were noticeably more difficult to cut with because the blades were not taut enough.

The exception to that is the Gramercy Tools bowsaw. Its 12-in.-long blade naturally deflects more than a 6-in. blade. In use, the Gramercy Tools saw cut beautifully and tension was not a problem. With the exception of the Knew Concepts and Gramercy saws, all the coping saws we tested relied on the frame to tension the blade.

TAUT BLADE CUTS BETTER



Taut blades deflect less. With the blade between a dial indicator and a screw head on the underside of a pivoting arm, we added weight to see how much each blade deflected.



Low tension equals frustration. A blade that deflects in the cut makes it hard to pull back and forth and difficult to control. That means the saw might not cut where you want it to.

MODEL	STREET PRICE	BLADE TENSION*	DOVETAILS	COPING	CUTTING CURVES	BLADE CHANGES	BLADE ROTATION	COMMENTS
Bahco 301	\$15	0.209 in.	Very good	Very good	Good	Very good	Good	Misaligned handle; stiff blade-rotation adjuster
Century Drill and Tool 4940	\$8	0.295 in.	Good	Good	Good	Very good	Very good	Twisted frame, misaligned handle, poor blade tension
Eclipse 70-CP1R	\$14	0.189 in.	Excellent	Very good	Very good	Good	Very good	Rigid frame with smooth blade rotation; blade difficult to install
Garrett Wade multi-function coping saw	\$34	0.195 in.	Poor	Fair	Fair	Very good	N/A	Spiral blade that comes with saw cuts slowly; takes standard blades, but they don't rotate
Gramercy Tools 12-in. bowsaw	\$150	0.260 in.	Very good	Very good	Excellent	Very good	Very good	Cuts fast due to its 12-in.-long blade, no indents for blade angles
Irwin 2014400	\$8	0.165 in.	Very good	Very good	Very good	Fair	Good	Inserting and rotating the blade requires a wrench; handle is uncomfortable
Knew Concepts	\$149	0.137 in.	Excellent	Excellent	Excellent	Excellent	Excellent	Light and rigid frame; easiest blade changes with eight positive detents
Lee Valley coping saw	\$16	0.170 in.	Excellent	Very good	Very good	Very good	Very good	Smooth and easy blade rotation; a very good saw overall
Olson coping saw	\$12	0.285 in.	Excellent	Very good	Good	Very good	Excellent	Blade can be rotated and locked in any position; poor blade tension
Robert Larson 540-2000	\$18	0.164 in.	Very good	Very good	Good	Very good	Good	Handle was misaligned; difficult to rotate blade
Stanley Fat Max 15-104	\$5	0.193 in.	Excellent	Very good	Very good	Very good	Excellent	Most comfortable handle; eight positive detents for blade rotation
Stanley Fat Max 15-106	\$10	0.284 in.	Good	Very good	Good	Very good	Excellent	Comfortable handle; poor blade tension
Tekton 6865	\$4	0.295 in.	Good	Good	Good	Very good	Very good	Uncomfortable handle; poor blade tension

*Number reflects the amount of deflection

Knew Concepts is a cut above

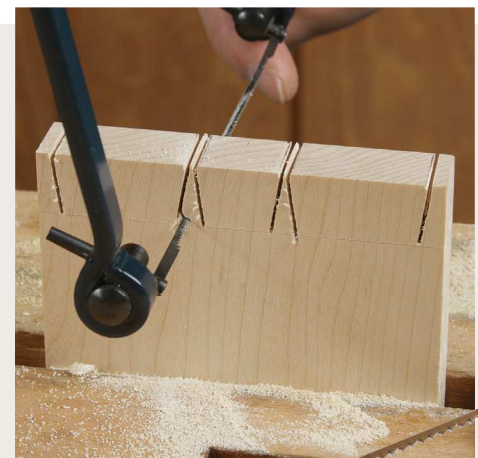
After all of the testing, one saw stood well above the rest: the Knew Concepts coping saw. It is light and rigid. A cam lever makes blade installation a snap, and there is a knurled knob to adjust the blade tension. No other saw provides a convenient way to do that. The pin-and-hole indexing system for blade rotation works very well.

But the Knew Concepts saw is much more expensive than the other saws we tested, except for the Gramercy Tools bowsaw. So the coping saw from Lee Valley, which costs over \$100 less, is our pick for Best Value.

Chris Gochnour contributed to this article.

Two blades make the cut

In addition to testing coping-saw frames, we tested blades. The best blade for removing dovetail waste is sold by Craftsman (No. 36064; \$2.50), but only in stores. It's just 0.08 in. wide and can turn in all but the tightest backsaw kerfs, so it's perfect for cutting parallel to the joint's baseline, allowing you to remove all but a sliver of waste with a single cut. For coping and cutting curves, we liked the Pégas 10-tpi blade (\$4 per dozen). For the cutting tests, we removed the blade that came with the saw and replaced it with these two great blades.

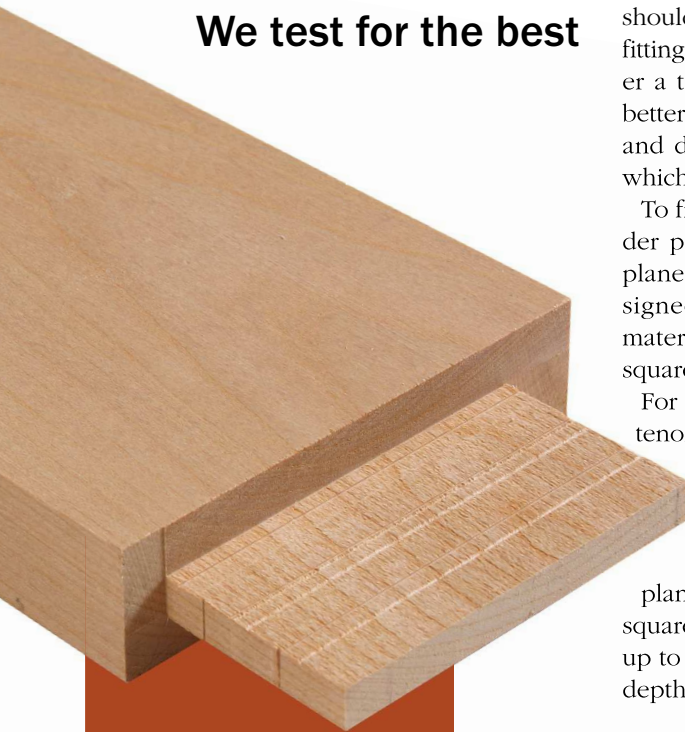


Pégas

Craftsman

Shoulder and Rabbet Block Planes

These tools trim tenons for a piston fit that machines can't match. We test for the best



A lot of woodworkers choose to cut tenons with a tablesaw, thinking it will be fast and dead-on, only to get frustrated when their “precise” setup results in ill-fitting cheeks or misaligned shoulders. Truth is, it's hard to cut perfect-fitting tenons using just machinery, whether a tablesaw, a router, or a bandsaw. A better approach is to cut the tenon close and dial in the fit using hand tools. But which is best for the job?

To find the answer, we compared shoulder planes, rabbet block planes, fillister planes, and bullnose planes. All are designed to cut into corners, removing material methodically and leaving crisp, square edges.

For a plane to be effective at trimming tenon cheeks and shoulders in standard hardwoods, it must have some basic characteristics. It should have a low cutting angle for making cross-grain and end-grain cuts. The plane's sole should be flat and perfectly square to the sides. The blade should hold up to the rigors of end-grain planing. The depth and lateral adjustments should be

easy and should hold. Finally, since these planes may be used in multiple positions, the body should be comfortable to grip with one or two hands.

The right planes for the job

We used all of the planes on tablesawn tenons to fine-tune the shoulders and cheeks, a job that involves tricky end-grain and cross-grain work. The stock was cherry, and the tenons were $\frac{1}{4}$ in. thick by 4 in. wide by $1\frac{1}{4}$ in. long. We judged the planes based on the test, as well as on their fit and finish and ergonomics.

After the tests, the bullnose and fillister planes fell out of contention while shoulder and rabbet block planes rose to the fore. With their low cutting angle, these planes handle end-grain and cross-grain cuts. And they're made for use with one or two hands; you can hold them in a number of positions to handle any trimming job.

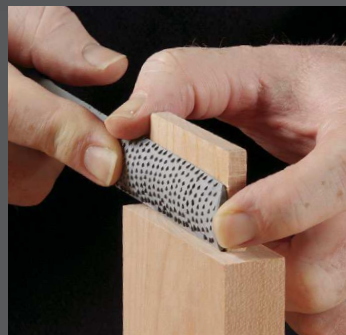
We recommend buying a shoulder plane first, and adding a rabbet block plane later (see “Which ones to buy ...” p. 99).

Chris Gochnour contributed to this article.

MACHINE-CUT TENONS NEED A HELPING HAND

Using a tablesaw, router, or bandsaw to cut tenons certainly makes the job faster and more efficient. But even with a careful setup, there are bound to be slight inconsistencies in the cuts, such as a shoulder that has a step. The path to a piston fit is to cut the tenons close, and then trim them using handplanes.

Wrong tools are hard to handle



You may be tempted to file, sand, or chisel your way to perfect tenons. But these methods are inconsistent. Files and sandpaper tend to round over the work, especially in the corner, and it's difficult to control a chisel over a longer surface without creating a taper.



READERS' RATINGS: SHOULDER PLANES

Readers and editors gave high marks to the Veritas Large plane, with the Lie-Nielsen running a close second in the ratings.

★★★★★	4.70	VERITAS LARGE
★★★★★	4.68	LIE-NIELSEN 073
★★★★☆	4.29	GORDON GIDGEE
★★★★☆	4.13	CLIFTON 3110
★★★★☆	4.11	CLIFTON 420
★★★★☆	3.73	STANLEY SWEET HEART 92
★★★☆☆	3.15	SHOP FOX D3752
★★★☆☆	3.08	SHOP FOX D3751

READERS' RATINGS: RABBET BLOCK PLANES

This category was incredibly close, with the Lie-Nielsen 60½ R edging into first place among readers and editors.

★★★★★	4.70	LIE-NIELSEN 60½ RN
★★★★★	4.58	LIE-NIELSEN SKEW 140
★★★★☆	4.54	VERITAS SKEW



Why planes work better

Shoulder planes and rabbet block planes reach into corners and remove material methodically in a way that power tools cannot, and they're more precise than files, sandpaper, or chisels. With each one, the blade should project slightly beyond the side (about 0.002 in.—the thickness of a sheet of paper) for best performance. If it doesn't project enough, the plane is pushed away from the corner and won't remove stock evenly.

Shoulder planes: The first choice for tenons



VERITAS LARGE

Shoulder planes excel at trimming the shoulders of tenons. But they also are great for sizing tenon cheeks. These planes range in width from ½ in. to 1¼ in. For furniture making, the larger models, ¾ in. or bigger, are more efficient. They cover more ground while still handling narrow shoulders well.

If a manufacturer offered different sizes of the same tool, we tested the largest one offered. We judged the planes based on how well they worked at trimming the shoulders and cheeks of tenons, as well as their fit and finish (flat sole, with sides perfectly square to the sole). We also evaluated the ergonomics of each one, and whether it is comfortable to hold with one or two hands.

Among this group, the Veritas model stood out, and we picked it as Best Overall and Best Value.

MODEL/STREET PRICE	WIDTH	EASE OF BLADE ADJUSTMENTS	FIT AND FINISH	PERFORMANCE	COMMENTS
Clifton 420 \$290	¾ in.	Good	Very good	Good	Blade needed lapping out of the box; mouth not adjustable; blade shifted laterally during depth adjustments.
Clifton 3110 (3-in-1) \$290	1½ in.	Good	Very good	Good	Blade needed lapping out of the box; mouth adjustments, made via shims, were difficult; blade shifted laterally during depth adjustments.
Gordon Gidgee \$185	1 in.	Good	Excellent	Good	Blade adjusted with a hammer, which takes practice; blade projection on top made plane hard to grip; mouth not adjustable.
Lie-Nielsen Large 073 \$250	1¼ in.	Good	Very good	Very good	Solid performer; casting recesses have sharp edges; blade shifted laterally as depth was adjusted; mouth easy to adjust.
Shop Fox D3752 (3-in-1) \$75	1⅜ in.	Good	Good	Fair	Blade was poorly prepped and failed on end grain; mouth adjustments, made via shims, were difficult; sole not flat.
Shop Fox D3751 \$60	¾ in.	Very good	Fair	Fair	Blade needed lapping out of the box and needed reshaping to make it parallel to sole; blade failed on end grain, mouth easy to adjust.
Stanley Sweet Heart 92 \$110	¾ in.	Excellent	Good	Fair	Sharp edges on body made tool uncomfortable to grip; blade projection was inadequate, making for inconsistent results; mouth easy to adjust.
Veritas Large \$230	1¼ in.	Excellent	Excellent	Excellent	Flawless tool; very comfortable to grip with one hand or two; blade lapped dead flat; mouth easy to adjust.



Rabbet block planes: Better for cheeks



LIE-NIELSEN
60½ RN



LIE-NIELSEN
SKEW BLOCK



VERITAS
SKEW BLOCK



Skew is the best. The blade on the skew rabbet block plane (above) is angled, which pulls it against the shoulder and leaves no tearout at the back of the cut. A normal rabbet block plane (right) cuts in both directions, making it more versatile.



With its wider blade, bedded at a low angle, a rabbet block plane is well suited to trimming the cheeks of a tenon efficiently. It can work on shoulders, but it's not as easy to use on its side as a shoulder plane. These planes are versatile, also working well as conventional block planes.

After putting all the planes through the same tenon-trimming tests as the shoulder planes, we picked the Veritas skew block plane as the Best Overall. Its skewed blade rabbets on only one side but cuts with less resistance and produces a flawless surface with no tearout. Buy the version that suits your favored hand and cutting direction.

One caveat: there's a learning curve associated with sharpening the angled blade, and perhaps some extra honing accessories to buy. For folks who don't want to deal with those issues, we recommend the Lie-Nielsen 60½ RN as a Best Value buy.



Article Extra

Get tips on how to sharpen a skew blade.

MODEL/STREET PRICE	EASE OF BLADE ADJUSTMENTS	FIT AND FINISH	PERFORMANCE	COMMENTS
Editors' Best Value Readers' Choice Lie-Nielsen 60½ RN \$175	Good	Very good	Very good	Cut quality is good; square, full-width blade rabbets on both sides; depth adjuster tended to shift blade laterally, so you must be careful.
Lie-Nielsen Skew Block Plane 140 \$225 (left or right handed)	Good	Excellent	Very good	Cut quality is very good; bronze body increases mass and heft, won't rust; depth adjuster tended to shift blade laterally, so you must be careful.
Editors' Best Overall Veritas Skew Block Plane \$215 (left or right handed)	Excellent	Excellent	Excellent	Cut quality is excellent; easy to set up and holds settings with the help of setscrews on side of body to align blade; extremely comfortable to hold.

Which ones to buy, and in what order

With its tall body, a shoulder plane is ideal for trimming tenon shoulders, offering great control while keeping your hands away from the work. It also can be used to trim tenon cheeks. Buy the biggest one you can (see recommendations, opposite page), which can handle any size shoulder and any tenon cheek.

The problem with a shoulder plane, even a large one, is that it's not the most efficient tool for cheeks. It requires multiple overlapping passes to tackle long tenons, which could

result in a tapered tenon if you're not careful. That job is best handled by a rabbet block plane, which has a wider blade (see recommendations, above). Though it can be used on a shoulder, its short body is a bit harder to hold on its side.

Out of both, the first one we'd recommend is the large shoulder plane, because it can do both shoulders and tenons pretty easily. Ideally, though, if you can afford it, add a rabbet block plane for cheeks. With both tools you'll be set up to trim perfect tenons every time, quickly and efficiently.

Toolbox Evolution

Tool storage gets a remake with custom-fit boxes that stack

Whether you're a finish carpenter, a woodworker, or a do-it-yourselfer, storing your tools so they are protected and easy to access is an important part of the job. Small wonder that a lot of folks like to hang onto those blow-molded plastic cases the tools come in. After all, the cases fit the tools, keeping them protected and, in appearance at least, well organized. Unfortunately, this strategy takes up a lot of space. All those cases can fill your shop shelves or truck bed to overflowing.

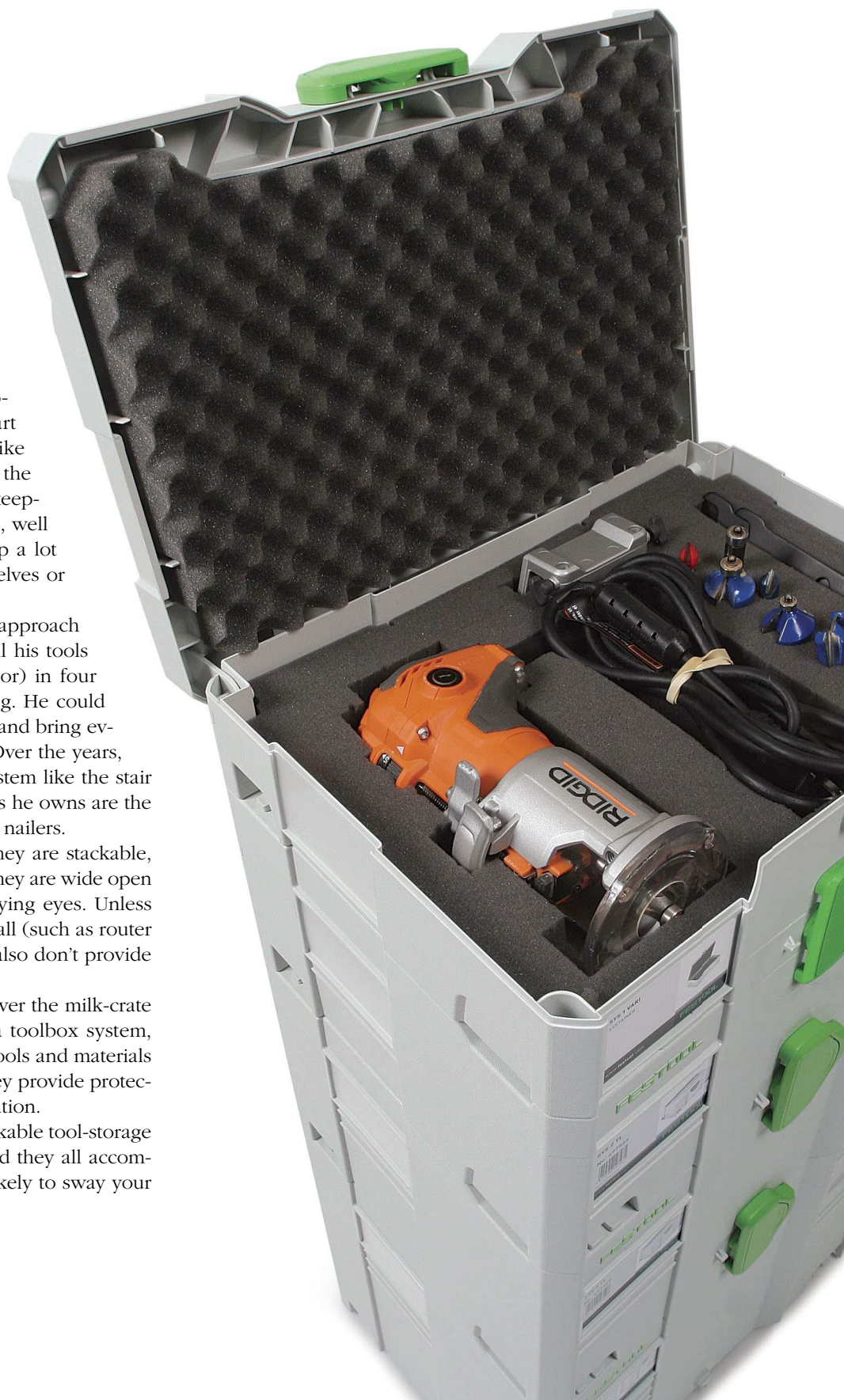
One carpenter we know learned a different approach from a stair-building contractor who carried all his tools (other than a miter saw and an air compressor) in four rectangular milk crates and a single canvas bag. He could stack two crates, throw the canvas bag on top, and bring every tool he needed onto the job in two trips. Over the years, the carpenter has moved closer to a simple system like the stair guy's. At this point, the only blow-molded cases he owns are the tiny ones that came with a couple of small pin nailers.

So, why not just use milk crates? Although they are stackable, nearly indestructible, and handy as step stools, they are wide open and exposed to dust, planer shavings, and prying eyes. Unless modified, they are not suitable for anything small (such as router bits) or thin and sharp (such as chisels). They also don't provide protection from dirt and moisture.

Today's toolboxes have specific advantages over the milk-crate system. Less individual toolboxes and more a toolbox system, these stackable units can be outfitted to store tools and materials from finish nails to 3-hp plunge routers, and they provide protection, organization, security, and easy transportation.

Here, we look at three examples of these stackable tool-storage devices. They have some traits in common, and they all accomplish the same job. The details, however, are likely to sway your decision about which one is right for you.

Kit Camp contributed to this article.





A SYSTEMS APPROACH

A newer concept in the United States, stackable toolboxes have a long track record in Europe. The concept is simple: Boxes are available in several heights but share the same footprint, allowing them to latch together into an easily movable stack. Because they are often sold empty, you can customize the interiors either with proprietary

inserts or with aftermarket accessories, such as pick-and-pluck foam, Kaizen layered foam, or homemade inserts.

We recommend keeping the interiors of each box simple, wasting the least amount of space with bins or thick foam. This way, you can either get more tools into the box or fit a tool and all its related accessories.

Where it makes sense, you might also arrange tools in groups—for example, a dedicated box for finish nailers—rather than individually.

Unlike storing blow-molded cases of all different sizes, packing tools in containers of a standard size makes it easier to store them in drawers in your truck, on shelves in your van, or in cubbies in your shop.



Toolboxes à la carte



- 1: \$50
- 2: \$60
- 3: \$65
- 4: \$70

BOSCH L-BOXX

Bosch imports the L-Boxx, a European product made by Sortimo. The footprint and interior volume of each L-Boxx is slightly larger than the equivalent Systainer (see below), but Bosch has four sizes instead of Festool's five.

At the moment, these boxes don't have as many stock variations and options as you can get from the Festool lineup, but the Sortimo website shows a wide selection of drawers, colors, inserts, and carts. Time will tell how many of these products Bosch will import, but the company has started packaging some

tools into these cases, an encouraging start. In the meantime, tool-specific inlays and generic L-Boxx accessories can be purchased from European sites such as RAlldiy.co.uk.

We also really like the color-coded bins in the L-Boxx1A, designed for sorting small parts or fasteners. The two smallest boxes have a front (briefcase-style) handle, and all four also can be carried by a top handle or with two hands on side handles. One of our testers left a box to slam around in a truck bed for a month, and it held up well, despite our worries about the



- 1: \$33
- 2: \$27
- 3: \$33
- 4: \$44

DeWALT TSTAK

To compete with the boxes from Festool and Bosch, DeWalt has built its TSTAK system from scratch. Although the boxes are stackable and somewhat customizable, they don't quite compare directly to the Bosch and Festool systems.

One of the boxes has a longer metal handle and can be placed only at the top of a stack. It has a lid compartment perfect for holding drill bits or similarly sized tools, and a main compartment that we found would just fit an 18-volt drill, two batteries, and the charger. The next box's outside dimensions are about the same, but it has a single compartment

roughly equivalent to the Bosch/Festool #2, about 5 in. deep. This box has a top and front handle, and it easily swallows jigsaws, drills, or random-orbit sanders. The next two boxes feature drawers with full-extension ball-bearing slides. One has a single deep drawer filled with smaller lidded boxes; the other has two shallow drawers with numerous dividers. All the boxes have a small label window, a nice touch for the truly meticulous.

The only big strike against the TSTAK as a do-all system is that no larger sizes are available. These boxes simply won't accommodate routers, circular saws, power planes, or other



- 1: \$63
- 2: \$68
- 3: \$76
- 4: \$80
- 5: \$86

FESTOOL SYSTAINERS

Festool products have always come packaged in plastic boxes called Systainers, made by a company called Tanos. These boxes include a molded insert designed to hold the tool and its optional accessories securely. Systainers are available separately in five sizes. One version, called Sortainers, sports small, medium, and large drawers. Festool also has Mini and Maxi Systainers, for really tiny or really big tools. To tie the system together, the company also offers a small dolly and a hand truck for wheeling stacks of Systainers around and cabinets designed for your shop. The boxes are designed to latch to vacuums as well.

These units evolved from an older model of Systainer, now referred to as a Classic Systainer. We liked everything about this old style except the small latches used to join boxes together and secure their lids, which proved time and again to be fingernail breakers.

One *Fine Homebuilding* contributor has used Systainers for the past eight years and has yet to break one despite dropping them, leaving them in his truck bed, checking them as luggage, using them as boxes to ship tools, and occasionally using them as step stools.

L-Boxx's comparatively thin sidewalls and the latches' flexibility.

PROS: Larger footprint and interior volume than comparable Systainer, and about 20% less expensive; 1-Click system makes for fast, secure stacking and unstacking.

CONS: Far fewer generic customization accessories and inserts; boxes require two hands to unlatch from a stack; thin sidewalls allow for a lot of flex, especially in larger boxes.



One click, but two hands. Bosch's 1-Click system allows the boxes to clip together simply by stacking them; there are no latches to operate. To separate the boxes, press a release button on each side of the box and lift. Unlike the others, these boxes require two hands to unclip and cannot be opened while in a stack.

large tools. We hope DeWalt will start offering some of its smaller tools for sale in these cases, and also expand the line to include larger sizes and more accessories. One big selling point for these cases is their low cost. They range in price from about \$30 to about \$40.

PROS: Plastic, heavy-duty latches inspire confidence in longevity; lids can be opened without unstacking boxes from above; each box includes a window for labels; lowest-cost option.

CONS: Less customizable than other systems; largest box is still too small for certain tools.



Rugged and simple. The DeWalt boxes require two hands to latch and unlatch, but unlike the Bosch boxes, they can be opened while stacked. The boxes also share some features with the familiar cases DeWalt has packaged its tools in for many years, notably the thick plastic sidewalls and heavy-duty metal latches.

This beautifully thought-out system isn't cheap. Prices start at \$63 for an empty Systainer 1, which is about 3½ in. deep—good for jigsaws, drills, and the like. Festool/Tanos offers the most stock accessories (inserts, foams, colored and locking latches, dollies) to customize the boxes.

Systainers are an expensive but excellent quality platform for an infinitely customizable and addictive storage system.

PROS: A single latch secures the lids and joins the boxes together; T-Loc Systainers are backward compatible with Classic Systainer boxes; has the most inserts and accessories.

CONS: Expensive.



One latch does it all. Festool's improved T-Loc boxes latch together with a simple twist of the same large knob that secures the lid, and they can be stacked atop the Classic boxes as well. Unlike other systems, the T-Loc boxes can be opened while stacked, an attractive selling point.

Paint Strippers

Safer products get the job done, but unfortunately, the fastest are the most toxic

Most of us are all too familiar with the scraping, sanding, and caulking that are part of the prep work for repainting. But when your next renovation calls for stripping the kitchen cabinets back to bare wood or uncovering some architectural details that have been hidden beneath too many touch-ups, you can be excused for being a little unsure about your next step. You know you need some kind of chemical stripper, but choosing the right product isn't easy. There are highly toxic liquids and supposedly safer gels, stuff that won't drip and other stuff that will, and these products all claim to get to bare wood in the shortest time possible. To help you decide which type of product is right for you, we've taken a close look at 10 commonly available paint strippers that span the spectrum of toxicity and ease of handling.



The test piece. An old, heavily painted antique door provided a perfect mix of flat surfaces and detailed molding for the product trials.

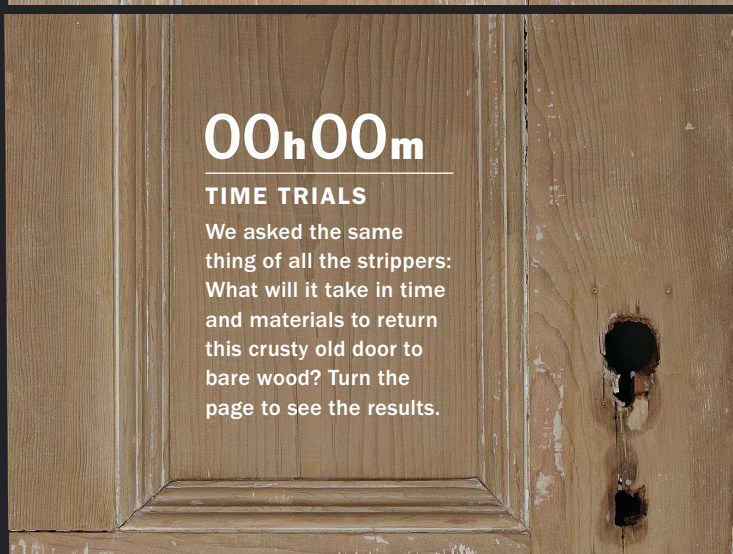
Goops, gels, and pastes

To minimize the downside of an already unpleasant process, it's important to find the right match between product characteristics and the job you're planning to do. As a general guide, most strippers are designed to remove paint from wood, masonry, and metal surfaces, although plastic, rubber, and linoleum are typically off-limits. Unlike the coverage estimates on a can of paint, there are so many variables involved in removing a finish that most manufacturers omit this information. Unless you're doing a lot of paint stripping, it's best to start by purchasing small containers of these strippers so that you don't waste money or get stuck with too many leftover chemicals.

The easiest and fastest application method is generally by brush, although the Franmar Soy Gel stripper can be sprayed. Dumond's Peel Away 1 was the thickest product we tested—similar to joint compound—so it goes on best with a plastic scraper (included with the product). All of the strippers do well on horizontal surfaces, which not only allows you to apply thicker coats, but also slows drying and speeds paint removal.

Although we found that a product's chemical makeup is more





Lion or lamb?



WHEN CHOOSING A CHEMICAL PAINT STRIPPER, the first question most people ask is about the product's toxicity. We all want good performance, but not if that means we won't be able to balance a checkbook after we put the can of stripper back on the shelf. While we're not chemists, we do know there's a toxicity spectrum, and there is no such thing as a perfectly safe paint stripper. All require some level of personal protection for skin, eyes, and lungs. The 10 products we tested feature ingredients ranging from relatively benign soybean extracts to the seriously hazardous methylene chloride. Although the chemicals differ, all seek to penetrate built-up coats of paint and ultimately weaken the bond between the bottom layer and the substrate.

UNAPOLOGETICALLY TOXIC

Most of the products that promise the fastest results—such as Klean-Strip's Premium Stripper or Zinsser's Power Stripper—rely on methylene chloride and a supporting cast of solvents to do the heavy lifting of paint removal. These are serious chemicals and threaten the user with various degrees of skin, lung, and brain damage unless proper precautions are taken. These requirements include heavy gloves, splash goggles, and a good respirator (not a dust mask). It's best to work outdoors, away from people and pets, and to have a supply of water on hand for emergencies. If this chemical splashes on your skin, you'll know it. Dumond's Peel Away 1, a zero-VOC formulation, is a partial exception. It doesn't produce the dangerous fumes of the methylene-chloride products, but it can still cause serious burns.

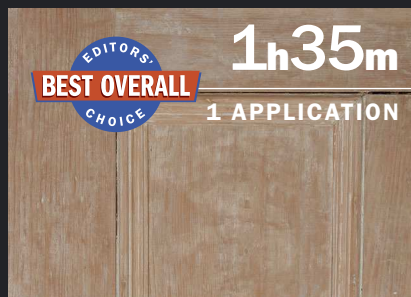
SAFE IS A RELATIVE TERM

The safer strippers still can be hazardous to breathe or to get on your skin, but the products in this category are like chemical child's play compared to the methylene-chloride concoctions. With proper ventilation, they're a good choice if you must work indoors. Although slow, they tend to stay active longer and can be left alone to work overnight. (In these cases, it's usually best to cover them with plastic wrap to keep the product moist and active.) Use this option sparingly, however, because these long contact periods can soften underlying wood surfaces and make them more susceptible to damage from scraping tools. Similarly, to minimize the risk to veneered surfaces, be sure to follow each manufacturer's instructions for limiting application times.

00h00m

TIME TRIALS

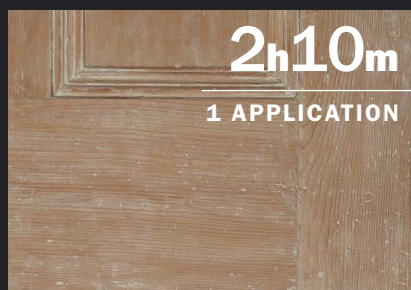
We asked the same thing of all the strippers: What will it take in time and materials to return this crusty old door to bare wood? Turn the page to see the results.



KLEAN-STRIP PREMIUM STRIPPER

\$9 per qt.

If you feel the need for speed, this is your choice. It began peeling up the top paint layer within three minutes and had fully stripped the test piece in a single application of 1 hour and 35 minutes. The methylene-chloride formula demands serious personal protection and should be used outdoors. Its jellylike consistency is difficult to spread into an even coat, and it will sag when applied vertically.



ZINSSER POWER STRIPPER

\$16 per qt.

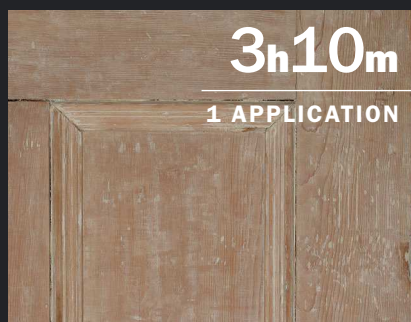
A methylene-chloride product for outdoor use, Power Stripper turned in the second-fastest time of the test, finishing off its test piece with one application of 2 hours and 10 minutes. Its clear formula is easy to brush, and it's best applied in thin coats when used on vertical surfaces. Its wet and glistening appearance makes it easy to identify dry spots that need touching up.



ZAR PAINT & VARNISH REMOVER

\$13 per qt.

This methylene-chloride stripper cooked through the top two layers of paint in less than 10 minutes and finished the entire test piece with one application of 2 hours and 20 minutes. It pours easily with the consistency of thick, stringy syrup, but heavy coats run when it's used vertically. The clear formula makes it easy to follow the stripper's progress, and equally easy to overlook dry spots. It should be used outdoors.



SAVOGRAN STRYPEEZE ORIGINAL

\$6 per pint

Although the slowest of the methylene-chloride strippers, Strypeeze still whipped our test with only one application of 3 hours and 10 minutes. Its fairly runny formula means that vertical surfaces are best attacked with thin coats. The light orange color shows what you've covered and reveals what you've missed. In addition to carrying the typical toxic-vapor risks—which is why it should be used outdoors—its solvents are highly flammable and must never be exposed to sources of ignition.



DUMOND PEEL AWAY 1

\$38 per 1¼ gal. (includes remover, paper, plastic scraper, and neutralizer)

Although it ranked well behind the methylene-chloride strippers, this unique paste-and-paper product has advantages. This water-based, low-odor stripper can be used indoors or out, although it's still nasty enough to cause skin burns. It was the easiest to apply and was the best on vertical surfaces. It works beneath a paper cover where you can't monitor its progress, but if you nail the correct time to peel off the paper, the paint will come off with little or no scraping. This product can soften and permanently darken some wood species, however, so it's best to check if it's right for your project.



68h00m

3 APPLICATIONS

CITRISTRIP SAFER PAINT & VARNISH STRIPPING GEL

\$14 per qt.

This was the fastest product among the less-toxic strippers tested. It reached bare wood over the entire test piece after 68 hours and three long applications, and it recorded more progress at each stage of testing than any of the comparable products. It is appropriate for indoor use with good ventilation and adequate personal protection. The consistency is thick, but it sags on vertical surfaces. The orange color makes it easy to track where the stripper has been applied.



70h00m

3 APPLICATIONS

FRANMAR SOY GEL PAINT STRIPPER

\$21 per qt.

Requiring three applications and 70 total hours, the Franmar Soy Gel finished a close second among the safer products. With its fairly liquid consistency, it can be poured, brushed, or applied with an airless sprayer. The downside of this flexibility is a greater tendency to drip and run on vertical surfaces. It's a good choice for indoor use with adequate precautions.



71h00m

3 APPLICATIONS

MÖTSENBÖCKER'S LIFT OFF PAINT & VARNISH REMOVER

\$10 per qt.

This water-based, indoor/outdoor stripper turned in a top-tier performance among the safer products; 71 hours and three applications were needed to strip the test piece. The no-drip container was the easiest of all to use; this was good because the product itself was runny and had little vertical cling. It dried more quickly than most of its competitors, which necessitated more-frequent touch-ups.



116h00m

8 APPLICATIONS

3M SAFEST STRIPPER PAINT & VARNISH REMOVER

\$10 per qt.

Judging by its low odor and minimal safety warnings, this product might well have lived up to its name as the safest stripper we tested. Unfortunately, safe doesn't mean fast, as it took eight applications and 116 hours to complete the job. The product is a creamy white goop that's easy to apply in a thick coat, though it sagged significantly when vertical. Although it finished the test near the bottom of the pack, its reasonably good performance on the test piece's first two layers of paint suggests that it packs enough punch for less challenging tasks.



143h00m

10 APPLICATIONS

ZINSSER MAGIC STRIP PAINT & VARNISH REMOVER

\$17 per qt.

Every race has its last-place finisher, and this stripper earned that dubious honor. It loitered through 10 coats and 143 hours getting down to bare wood. Like 3M's Safest Stripper, the Zinsser Magic Strip eliminated the test piece's first two paint layers fairly quickly, so it has potential for light-duty work. It can be used indoors with adequate ventilation and a respirator, and it's also one of the few formulas compatible with fiberglass surfaces. Product consistency is very thick and is excellent for vertical surfaces. The manufacturer claims that the stripper will change color from green to pale green when it's ready to be scraped away, although we scarcely noticed the switch.



important than its consistency, it's also true that thicker, more tenacious formulas are what you want for vertical applications. Peel Away 1 was in a class by itself, especially for overhead work. Among the safer alternatives, the Mötsenböcker formula was quite runny, while Zinsser's Magic Strip was definitely the stiffest option.

The results:

Do you want speed or safety?

The good news is that all the products in this roundup were able to get the job done. If time is short and you need to work fast, methylene-chloride strippers are the best option. If the only criteria you're concerned with are speed and effectiveness, they won this race hands down. When used cautiously, they'll yield quick results without frying your brain. Our top pick from the field is Klean-Strip's KS-3 Premium Stripper, which went to work almost immediately and stripped its panel faster than any other product. The other three methylene-chloride strippers were nearly as fast and would also be good choices. We would turn to Dumond's Peel Away 1 for large or intricate surfaces, and for its excellent control of lead paint.

The safer paint strippers weren't nearly as fast as their more toxic brethren, but they might still be the best choice for your next paint-stripping project. If you're working indoors and have plenty of time, or if the task is fairly light and your personal safety is paramount, there are plenty of good choices available. During our test, all of the less toxic products quickly cut through the first two layers of paint and then slowed down, but the clear frontrunner was the Citristrip Safer Paint and Varnish Stripping Gel. The Franmar and Mötsenböcker products were nearly as good and finished close behind. □

Andy Beasley contributed to this article.

HOW WE TESTED

Don't stop until all the paint's gone

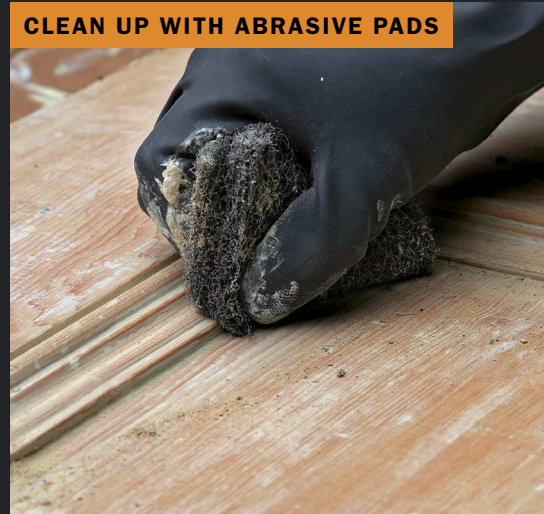
CHECK FOR LEAD PAINT



READERS' RATINGS: PAINT STRIPPERS

Readers judged the Dumond Peel-Away 1 as the best of the bunch, while the editors' choice, Klean-Strip, scored in the middle of the group.

★★★★★ 3.95	DUMOND PEEL AWAY 1	★★★★★ 3.57	CITRISTRIP SAFER PAINT & VARNISH STRIPPING GEL
★★★★★ 3.89	FRANMAR SOY GEL PAINT STRIPPER	★★★★★ 3.56	3M SAFEST STRIPPER PAINT & VARNISH REMOVER
★★★★★ 3.68	ZINSSER MAGIC STRIP PAINT & VARNISH REMOVER	★★★★★ 3.55	ZAR PAINT & VARNISH REMOVER
★★★★★ 3.63	ZINSSER POWER STRIPPER	★★★★★ 3.45	SAVOGRAN STRYPEEZE ORIGINAL
★★★★★ 3.59	KLEAN-STRIP PREMIUM STRIPPER	★★★★★ 3.20	MOTSENBOCKER'S LIFT OFF PAINT & VARNISH REMOVER

BRUSH ON STRIPPER**SCRAPE FLATS, SCRUB PROFILES****CLEAN UP WITH ABRASIVE PADS**

THE GOAL WITH THIS TEST was to put all of these strippers—from the hazardous to the mild—in a head-to-head competition to find out whether effective stripping performance requires the toughest chemical formulas. There are more chemical strippers on the market than the editors could review in a single article, so we decided to focus this test on those that are best suited to removing paint. We selected 10 readily available paint strippers from across the toxicity continuum. We chose four methylene-chloride strippers to represent the most hazardous options—those that require users to protect themselves against eye, skin, brain, and lung damage. The remaining six products range farther down the toxic spectrum, to the point where wearing protective gloves is little more than a recommendation.

A COMMON TASK

For the test surface, we used an old, heavily painted antique door cut into 10 pieces, with each piece featuring a mix of flat surfaces and detailed moldings. We assigned each stripper to a numbered section of the door, and logged how long it took for that product to remove the multiple layers of paint. The objective wasn't to prepare the wood fully for a new finish, but rather to find out how quickly we could reach a reasonably paint-free surface. The first step we recommend when starting a project like this—especially with obviously old paint—is to test for lead. When our home test kit turned in a positive result, we made sure to have the proper protection for our tester and his surroundings. Given that we were already planning to deal with some seriously dangerous chemicals, it didn't require much extra planning to cope with the lead threat as well.

ELIMINATING VARIABLES

Our tester applied most of the products with a cheap, disposable chip brush, noting the time he put on and removed each coat. We monitored the air temperature to make sure it remained within the manufacturer-specified range throughout the entire time each product was at work. We provided for adequate ventilation, but without any excessive air movement. Knowing that the products would lose effectiveness if they dried out, we closely monitored each test piece and touched up dry areas or added a covering of plastic wrap to keep them moist. Dumond's Peel Away 1 was the only product tested that was designed to be covered with a proprietary paper to keep the

product active (and later, to speed its removal). Although we generally worked with the pieces in a horizontal position, we routinely tipped them up to test each product's ability to cling to a vertical surface.

EXPERIENCE FILLS IN WHERE THE LABEL LEAVES OFF

While it's true that the making of a paint stripper is a science, the decision about when to remove a stripper from a painted surface is an art, or maybe voodoo. Despite advertising claims to the contrary, it's impossible to predict with any accuracy how long to wait before removing a coat of stripper, or how to decide when it makes more sense to start over with another application. Instead of simply staring at our wristwatches and hoping for the best, we periodically scraped small patches of the surface to see if the product had managed to penetrate the built-up layers of paint. As soon as the test patches revealed either bare wood or a stalled stripper that was making no headway, we recorded the elapsed time and then removed the stripper and the softened layers of paint. We used a variety of tools for this step: metal and plastic scrapers with both square and rounded corners, toothbrushes, bristle brushes, woven abrasive pads, and steel wool. Although the goal of scraping is to remove paint without damaging the underlying surface, we worked fairly aggressively.

PATIENCE EVENTUALLY PAYS OFF

The methylene-chloride products each required a single application of about three hours or less, but the five less-toxic strippers took additional applications and much more time. In each case, we left the first coat of these products on their respective door sections for a full 24 hours, and then scraped them off even though they had not yet reached bare wood. After that, on subsequent applications, we experimented with various contact times to determine the optimum stripping period for each product. Some strippers appeared to make progress throughout a 24-hour application, while others stalled and seemed to benefit from being removed and later reapplied to the newly scraped—and somewhat abraded—upper layer of paint. While it might seem logical to leave the strippers on for a full 24-hour period each time, we soon learned that there's a downside to the old adage of "letting the stripper do the work." The longer contact times raised and softened the wood grain, which made it far more susceptible to scraping damage.

The Indispensable Digital Multimeter

This tool is a must-have for electrical troubleshooting

If we had to carry only one device for electrical work, it would be a digital multimeter (DMM). Most of the other electronics we carry are adjuncts that do some of the same things a basic, quality multimeter can do. Available in various shapes and sizes, these fairly small, stout boxes consist usually of a display, wire leads that attach to the item being tested, and switches or knobs to choose between multiple metering functions—hence the tool's name.

The original multimeters were analog, and they used a needle and gauge (like a speedometer in your car) to give readings. Digital multimeters are now more common; they use an LCD screen to display readings with numerical values. Quality and functions differ from one model to another, and prices vary accordingly.

Electrician Brian Walo contributed to this article.



STYLE Some meters include a split fork, a hook, or a clamp that allows you to measure the amps running through a wire or cable without having to expose the conductors. All three styles do essentially the same thing, but each has a niche. Fork meters can fit into tighter spaces, which is helpful when cables are run close together. Meters with hooks or clamps make hands-free operation easier.



FORK



HOOK



CLAMP

LEADS Most, if not all, DMMs come with probe-tipped leads. Some more expensive models include alligator clips, which can be attached to conductors rather than having to be held in place.



A sparky's sidekick

The quality of a digital multimeter and the features it offers are going to play a driving role in cost, so you don't want to buy more meter than you're going to need. (The Amprobe AM-60, shown here, costs \$60.) We're tool junkies, so we understand the desire to buy the best. But even though all the available bells and whistles sound really cool, you probably won't need a DMM capable of measuring 1,000 amps for your next remodel. Functions we consider useful but not strictly necessary are temperature and noncontact voltage detection. We wouldn't spend extra on a DMM with these functions because other tools do the same things and cost less. That said, there are some basic functions that are must-haves for residential work.

ACCURACY

Digital multimeters commonly have an accuracy of $\pm 0.5\%$. Unless a multimeter is listed as "true RMS," it can be assumed to be an "average-responding" tool. Electricity travels through wiring in waves, so an average-responding meter essentially takes an educated guess at how much current is flowing based on the assumption of a perfect waveform of electricity. True-RMS meters take actual measurements but are more geared for working with computers filled with semiconductors (or building a robot in your basement) than for doing residential electrical work.

DURABILITY Like any electronic device, a multimeter typically doesn't like to be dropped, rained on, or left in the sun. But Klein's MM500 meter is sealed completely against dust and water and is designed to withstand up to a 10-ft. drop.



CATEGORY RATING Developed to ensure that the right diagnostic tools are used for the wide variety of applications, category ratings appear on all multimeters, ranging from category I (cable, telephone, etc.) to category IV (commercial and industrial power distribution). Category III is ideal for residential work and is approved for fixed installations such as residential panels, circuit breakers, wiring, receptacles, and fixtures.



DISPLAY A simple lamplit display will get the job done, but if we had to buy a new meter tomorrow, we'd get one with a bright backlit or other high-contrast display, the bigger the better. Milwaukee's meters have a particularly nice white-on-black display.



MAX AMPS Since 400 amps is typically the absolute max for service to a residence in our area, we like a meter that can read slightly above that range, just to be on the safe side.

RANGING Changing the range of the multimeter allows you to dial in the precision of the readout. If you're measuring a 120v circuit, it's more helpful to have the range of the multimeter set between 0v and 200v than it is to have it set between 0v and 1000v. It's also a matter of safety, as setting the range too low could mean blowing a fuse in the multimeter. We prefer an auto-ranging meter so we don't have to think about setting the dial, but there are meters with both auto-ranging and manual-ranging functions.



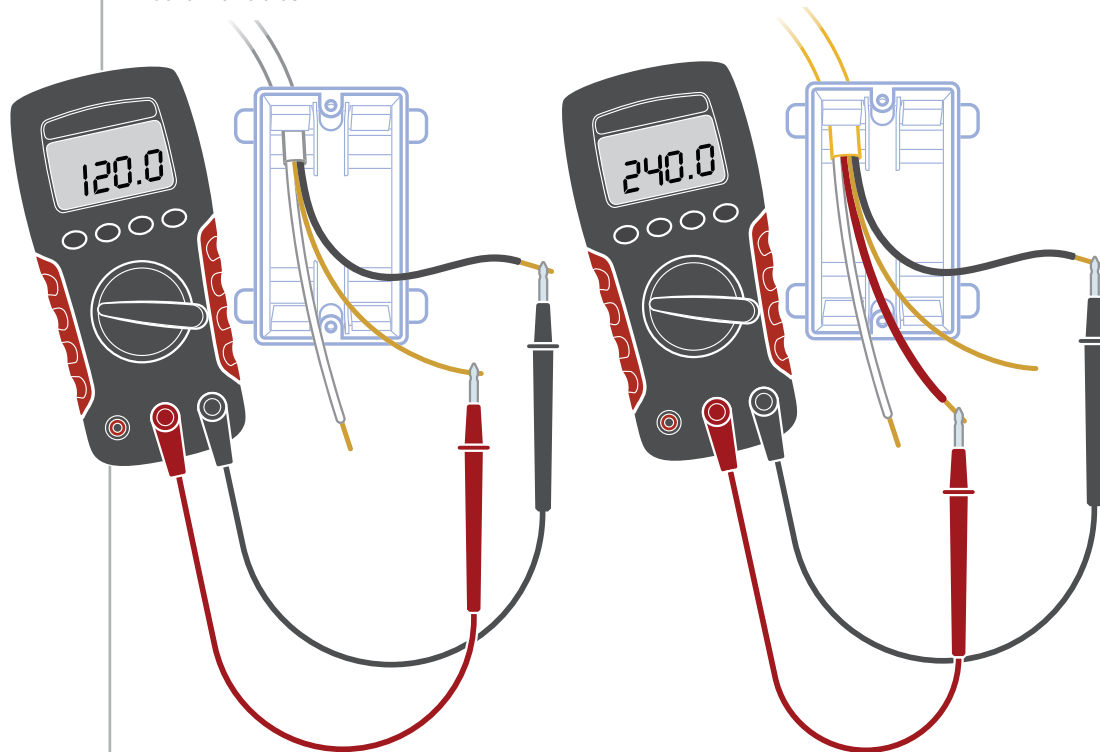
THREE KEY FUNCTIONS

Even the most basic, dirt-cheap multimeter is designed to measure at least three fundamental components of electrical energy: volts, amps, and ohms. You can't get by without these three basic functions, and aside from the very cheapest of available options, which might not include an a.c.-voltage function, you'd be hard-pressed to find a meter that doesn't do all three.

If you think of electricity like water flowing through a pipe, volts would be like the pressure (electrical "psi"), the amps would be like the number of gallons per minute (electrical "volume"), and ohms would be akin to anything limiting water flow, such as pipe diameter or obstructions inside the plumbing.



Voltage Our appliances and devices are designed to operate at specific voltages, such as the 120/240-volt services supplied to millions of U.S. homes. Anything above that designed voltage can result in catastrophic damage, which is why surge protectors are so important for computers and other electronic devices. Voltage drop, which is when the voltage reaching a device is less than designated, is also a concern. This can be caused by bad wire splices or junctions, loose connections within the circuit or on the panel, oxidation or corrosion of a connection or conductor, wiring that's too small for the load being carried, and many other variables.

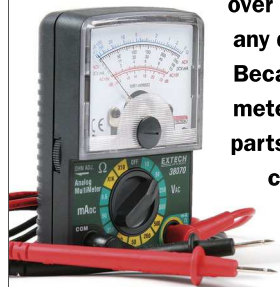


IN USE: First, set your multimeter to a.c. voltage. Touch one of the leads to the neutral or ground wire*, and touch the other lead to the suspected hot wire. The meter will indicate what voltage is present within the conductors. A 120v circuit should read 120v between hot and neutral or hot and ground, and 0v between neutral and ground. A 240v circuit should read 240v between the two hot conductors, and 120v between each of the hot conductors and the ground. If the 240v circuit has a neutral wire (typical for appliances like ovens and dryers), you should get 120v between black and ground or black and neutral, and 120v between red and ground or red and neutral.

*It's good practice to check for voltage against both the ground and the neutral conductors in the event that one is damaged or malfunctioning and would give a false negative.

ANALOG VS. DIGITAL

We've used numerous analog and digital multimeters (DMMs). Each has its pros and cons, but we'll take a stout DMM over an analog model any day of the week. Because analog meters have moving parts that must be calibrated, they're more delicate and susceptible to damage



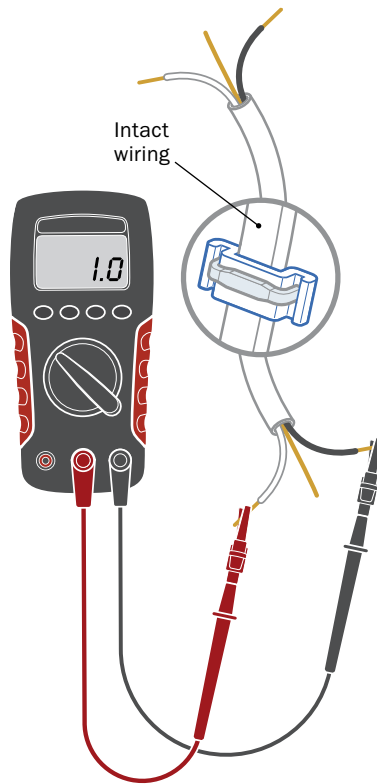
from the rigors of job-site use. Also, unlike DMMs, analogs generally have to be set manually to a specific range for measurements, which can lead to incorrect readings or even damage to the meter if you're not paying careful attention to the settings or where the leads are plugged in. Still, it's worth noting that although DMMs offer more consistent results, they aren't always as true to reality as a comparable analog meter with similar specs.

DMMs also can pick up "phantom" voltage—nonexistent voltage induced into a circuit by other nearby sources—that analog meters won't register. We'd still rather have a DMM, since they're easier to read and are less sensitive to the beatings doled out on the job site every day. We've also found that you can get a good-quality digital meter with numerous features for less than a good-quality analog these days.

Ω Ohms Measured in ohms, resistance is what slows down the flow of electricity and creates heat. Therefore, it's helpful to know what, if any, resistance is present in your wiring that should not exist.

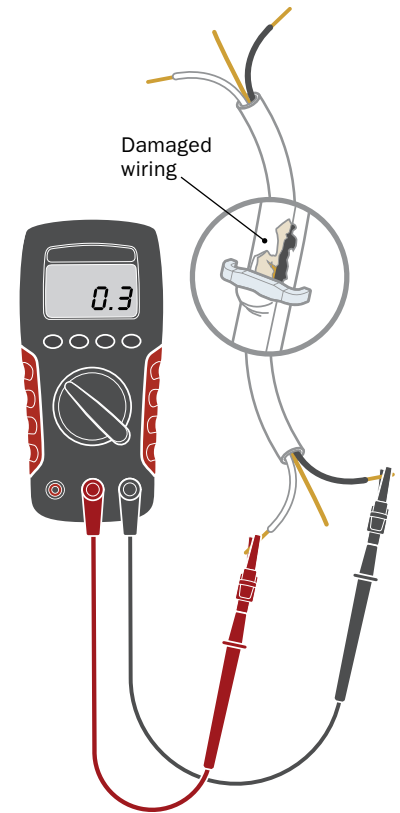
Resistance can be created by anything that changes the characteristics of the device or wiring connected to it. For example, a staple that's overdriven to the point of damaging the wire, wiring that's too small for the breaker it's attached to, corrosion on conductors and devices, or poor connections can all lead to resistance.

Continuity is the ability of electricity to flow through a component. It's measured by way of the resistance of the wiring and/or device. A multimeter's continuity function can tell you whether there's a fault in a run of wiring, can be used to trace runs of wiring between workboxes, and can allow you to test the function of devices such as toggle switches, which have to be completely disconnected from all wiring.



IN USE: To check a wire for a fault, it must first be completely de-energized and disconnected from all other wiring. Clip one lead to the hot conductor and one to the neutral conductor. As long as the opposite ends of the wiring aren't touching anything, most meters will read 1* (for infinite resistance) in a perfectly intact section of wiring. If you get a reading other than 1, there is something in that run of wiring that's bridging the hot and neutral. This could be an errant drywall screw or an overdriven staple that has damaged the insulation and allowed a fault in the line.

*Verify the reading in your DMM's manual.



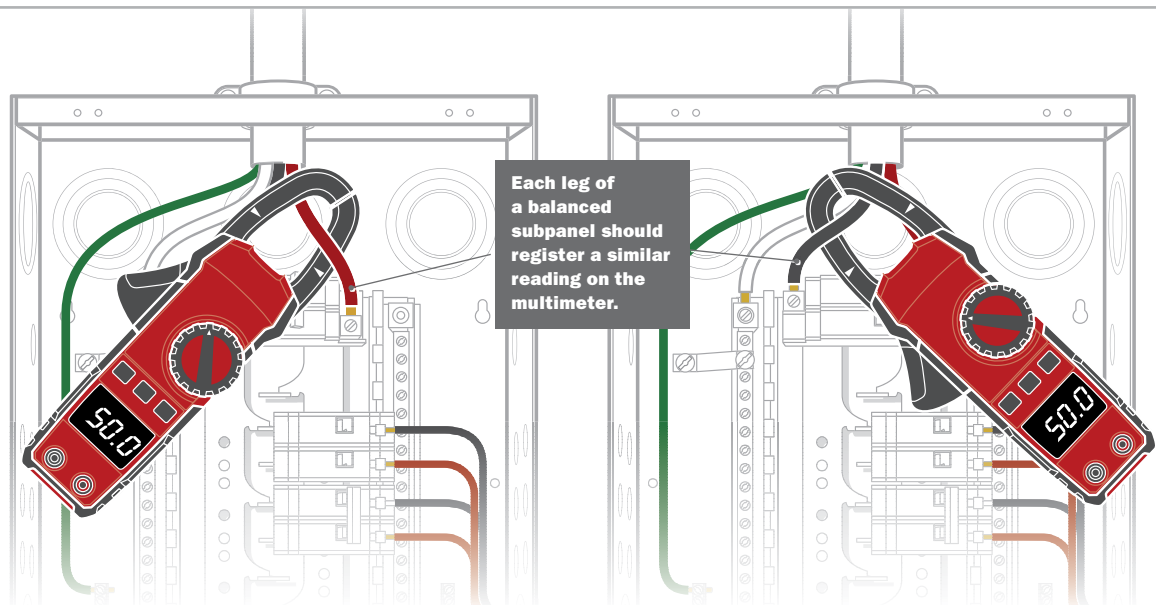
⌚ Amps While voltage remains more or less constant, amperage varies based on use. For instance, if you have a toaster plugged into the wall, your multimeter will show voltage running through the wire, but if the appliance is off, no amps will be flowing through the wire.

Amps are important because they measure how much electricity you're using when you turn on the oven or when the air conditioner cranks

up. Having too many amps running through a circuit creates friction (resistance), which creates heat. If the breaker doesn't trip soon enough, a fire could start.

We use the amp function most often to balance the load in a breaker panel. If you have a lot of equipment on one leg of the service and the other leg isn't carrying anything, your neutral has to carry a more substantial load, which wastes energy and may create an overload. This is more of a problem with heavy 120v loads (such as those from a tablesaw or a window air conditioner) than for 240v circuits on a double-pole breaker.

If you expect to do this type of work, we recommend using a clamp-on meter because it allows you to check amperage safely without having to touch any exposed conductors.



IN USE: Without touching any bare conductors, and while everything is off, remove the cover to your subpanel. Insert one leg of the wire feeding the panel into the jaw of the meter. Turn everything on, and write down how much current is being used. Power everything off, and do the same to the other leg of the feeder. Compare the two results to see how close to balanced you really are, and adjust circuits from one leg to the other as necessary if the loads are drastically different. Try to put things that run at about the same time on opposite legs. For instance, a one-man shop won't need enough amps to run the tablesaw at the same time as the thickness planer, but it may be likely that the tablesaw and dust collector are running simultaneously.

Measure Angles the Digital Way

Little electronic gauges read angles anywhere you need



If you haven't seen them before, digital angle gauges measure the angle of tilt after being zeroed to a reference surface. They have a magnetized base that attaches easily to most machine tables, fences, and blades in the shop.

Wixey was the first to market one of these magic little electronic cubes to woodworkers, in 2006, and other brands and models soon followed. Before long, they were appearing in the pages of *Fine Woodworking* as woodworkers found a host of uses for them, from setting the bevel on a sawblade to setting up a honing guide.

The appeal is powerful: having one easy-to-read digital gauge that will guarantee any angle, from square to level to everything in between. But we found ourselves wondering exactly how accurate these little angle gauges are. Are they better than the usual tools woodworkers use for setting angles: a good square, drafting triangles, or a bevel gauge?

We started by interviewing woodworkers who use these gauges. We also reached out to our online readers in a blog. We heard opinions on all sides, and discovered uses aplenty, but no one had done any real testing.

Accurate to a point (0.1 actually)

Our next move was to order all the digital angle gauges we could find. There are a dozen or more, but not all are relevant to woodworkers. We stuck to those with magnetic bases, small enough to fit on the part of an angled tablesaw blade that sticks up above the throat plate.

As soon as the gauges arrived, the editors gathered and started designing tests (see "Testing reveals two favorites," p. 117). It didn't take long to figure out which ones were the most accurate, and just how good those are. The most sensitive models are accurate to plus or minus $\frac{1}{10}$ of a degree.

But what does that mean in real wood-working terms?

Ultimately we determined that these digital gauges are best for any place where a good square won't work. They will get you extremely close to the perfect setting, but not quite as close as bending over and looking for that sliver of light along the edge of a square. For angles other than 90°, however, a digital angle gauge is a wonderful tool. It will get you at least as close as a drafting triangle will, for example, and closer than the protractor head you can buy for most combo squares.

In any case, test cuts are the only real way to guarantee success. But it is a real benefit to be able to get a machine setup extremely close to start with, so just a little bump one way or the other delivers a gap-free joint.

Tips and techniques

These are simple tools, but there are tricks to using them accurately. Some units have magnets on the side as well as the base, but those magnets were not square to each other in our tests. So one tip is always to reference the gauge off the same side, both when zeroing it and placing it on whatever is being tilted.

Stick it on sawblades—The bevel scale on most machines, such as tablesaws and miter saws, is just a rough series of graduations that only gets you in the neighborhood of the angle you want. By zeroing a digital angle gauge on the table and then sticking it to the blade, you can dial in any angle to a very close degree of accuracy. Be sure to zero the gauge by placing it on the cast-iron top, not the throat plate, which probably isn't perfectly flat. This is how woodworker Craig Thibodeau sets up his tablesaw for cutting the long miters on his veneered casework, and how he dials in

READERS' RATINGS: DIGITAL ANGLE GAUGES

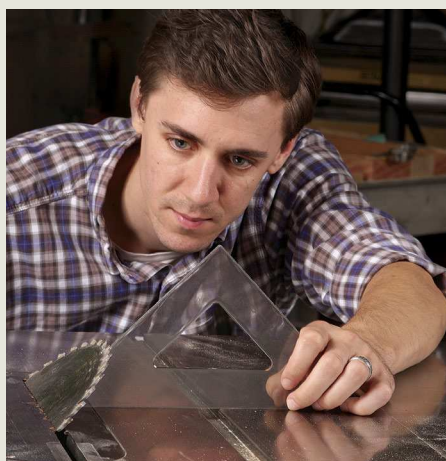
Readers agreed with editors on these tools, placing both Wixey models at the head of the pack.

- ★★★★★ 4.17 WIXEY WR365
- ★★★★★ 4.03 WIXEY WR300
- ★★★★★ 4.01 TTC BEVEL BOX
- ★★★★★ 3.95 CMT ORANGE TOOLS DAG-001
- ★★★★★ 3.93 GRIZZLY H8131

Best for angles off 90°



Not quite as good as a good square. You can tilt a tablesaw blade enough to see a tiny sliver of light in both directions without changing the numbers on the screen, demonstrating the margin of error inherent in these gauges.



Better than some other tools. For angles other than 90°, a digital gauge will get you at least as close to 45° as a drafting triangle (left), and closer than the protractor attachment for a combination square (right).



Often need test cuts anyway. No matter what setup tool you use, only test cuts will tell the whole truth. The trick is to get as close as you can beforehand, and a digital angle gauge does a very good job at that, with no bending over or squinting required.

A host of helpful uses



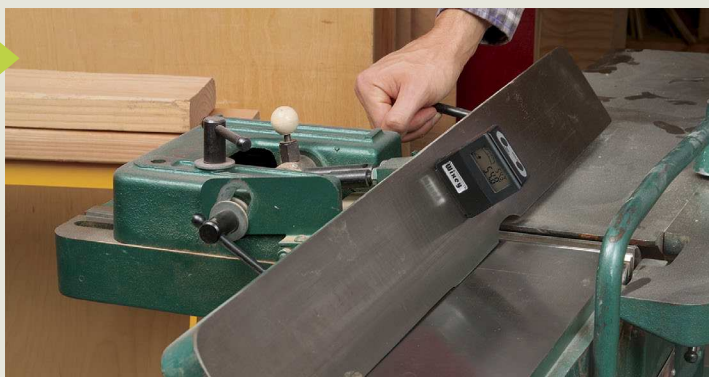
Dial in bevel angles on any blade.

Zero the gauge on the saw's table (above), avoiding the throat plate. Then stick it on the blade in a plumb position (right) and adjust the tilt to any number you need.



Fine-tune fences.

A jointer can mill smooth bevels on the edge of any workpiece. Keep the gauge aligned in its two positions, in other words square to the fence when zeroing it on the table, and square to the table when placing it on the fence (as shown).



A trick for miter gauges.

Zero the gauge on the saw's table, and then place the miter gauge's fence facedown. With the gauge stuck to the miter bar, you can now read any fence angle.



Guide your honing.

A digital angle gauge is the perfect tool for setting up a honing guide, ensuring that you return to the same angle every time.



Sometimes it's the table that tilts. In this case, when angling a bandsaw table to cut dovetail pins, you zero the gauge on the blade (top), not the table. Stay clear of the teeth for a true reading. Then move it to the table (above) and dial in the angle.

his chopsaw blade when tilting it to miter moldings and frame parts. Of course, he still cuts test pieces to be sure his joints will be square with no gaps.

A few more tips will help with accuracy. When you place the gauge on the blade of any tool, make sure it is as plumb as possible. It won't read as accurately if it is tilted backward or forward. Tool expert Roland Johnson also suggests dialing in your angle, and then taking the gauge off the blade and turning on the saw for a second. This lets any backlash in the adjustment mechanism settle, which might change the reading. Now check it again.

Works great for fences and tables, too—The same principles apply for setting fences on various machines. To set up tables that can be angled, like the ones on a drill press, bandsaw, or sanding machine, you first zero the digital gauge on the blade, bit, or platen, and then put it on the table. Be sure to keep the gauge exactly vertical. When angling a table, check the machine again once everything is locked down, because tightening can slightly change things.

Readers and woodworkers weighed in with many other uses. What you see on this page is just the beginning. And no matter what you use your digital angle gauge for, you'll enjoy being able to read any angle at a glance. Try one for yourself, and we think you'll like it. □

Ben Blackmar contributed to this article.



Works on workpieces, too. Michael Fortune uses his angle gauge to cut square edges on curved panels. He zeroes the gauge on the sled, and then puts the curved panel in place. Then he places the gauge halfway across his cutting line and tilts the panel to bring the gauge level.

Testing reveals two favorites

There are all sorts of digital angle gauges on the market these days, for a variety of industries, so we focused on those most relevant to woodworkers. That meant they had to be small enough to fit on the side of a sawblade without hitting the arbor or teeth, and magnetized on at least one edge. We also ignored a few models that were identical to one in our test group but included features not useful to most woodworkers.

One simple test did the best job of determining accuracy. We placed each gauge on a 12-in. steel ruler, resting on a flat jointer bed, and zeroed it. Then we stacked slips of paper (each 0.004 in. thick) under one end of the ruler until the screen changed from zero. This quickly separated the group into two categories of sensitivity. The setup also created a triangle with three sides of known lengths. A little trigonometry then gave the exact angle of tilt, in degrees. We repeated this test 10 times on each gauge, zeroing it again each time.

The results matched manufacturers' claims, so full marks to them for truth in marketing. Those that claimed 0.1° of accuracy in both directions delivered



CMT Orange Tools
DAG-001
\$35

Best of the bunch.
We tested 10 digital angle gauges but these five were the easiest to use and delivered the highest degree of accuracy: +/- 0.1°.

just that. Same for those that promised +/- 0.2°.

The rest of the review came down to features. For example, some gauges offer an absolute-level button. However, our tests showed a traditional bubble (spirit) level to be at least as accurate or sensitive as the best gauges in our group. Other gauges offer magnets on two sides, but since their sides were a bit out of square, we didn't find that feature helpful.

However, the Wixey WR365 does have a couple of unique features that matter (see photos, right).

Grizzly H8131
Digital Bevel Box
\$45

TTC Bevelbox
Angle Gage
\$70

EDITORS' CHOICE
BEST VALUE

Wixey WR300
\$30

Wixey WR365
\$40

EDITORS' CHOICE
BEST OVERALL

READERS' CHOICE

WIXEY WINS OUT

Among the most accurate gauges, the Wixey WR365 (\$40) has two stand-out features: a tilting screen for easier reading, and a V-groove on the bottom. It is a toss-up among the rest of the group, with the Wixey WR300 edging out the rest simply on price.



Newest Wixey has standout features. The tilt-up screen helps to defeat glare and saves you from bending over. A V-groove on the bottom registers the gauge accurately on a drill bit, and is surrounded by narrow magnets that fit nicely on the side of a typical bandsaw blade.



Our best test. With the gauge on top of a steel ruler, we then zeroed the ruler on a jointer table and began slipping strips of paper under one end. The best gauges allowed on average just four layers of paper before the reading changed from zero to 0.1°.

Maintenance

Protect Against Rust

New products thrashed old favorites in our tests

If you live in a humid area of the country, you are more than likely familiar with the menacing presence of rust, especially if you work in an unheated basement or garage shop. To help protect your expensive woodworking tools, you need to take steps to prevent rust. One way is to coat iron and steel surfaces with a rust inhibitor. But which one?

Look on any woodworking forum or website, and you'll see a lot of recommendations about which products to use. To end the debate, we put 20 of these commonly available preventers—from waxes to natural oils to petroleum-based products—through a torture test to see which ones work best. Here we'll share the test results, along with some basic strategies for fighting rust. Before you can go to battle, however, it's important to understand how rust forms.

Water is the instigator

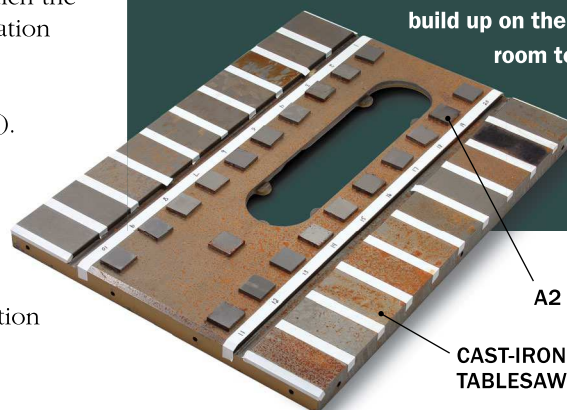
Rust (iron oxide) is a form of corrosion that occurs when both iron and oxygen are exposed to moisture, whether in the air or on the surface. That moisture is the medium through which the players that chemically cause corrosion travel. Rust formation can be accelerated with the addition of a stronger oxide or acid—the salt in sea air, for instance, or the moisture from your fingertips (ever see prints on your hand tools?). The process also speeds up with temperature variations that cause condensation. The corrosion starts on the surface and spreads like a rash. As corroded metal flakes away, fresh iron surfaces are exposed to the oxygen and water, and the process begins anew until the metal disintegrates. The key to stopping the degradation is to prevent water from mixing with iron and oxygen. And that's what these various coatings are meant to do.



Tough test

To test the rust preventers, we applied them to a cast-iron tablesaw top, leaving the center portion untreated to serve as the control. We spritzed water on the top, put it outside under an overhang, and waited. Our goal was to accelerate what happens over an extended period in some unheated garage spaces, where the top would be subject to the extreme temperature ranges of the outside air that would cause condensation.

We also applied the coatings to A2 steel samples. We placed the samples in a freezer for a few hours, removed them, and put them in a lidded plastic container. We repeated the freeze-thaw process once daily, to allow condensation to build up on the steel as it reached room temperature. The rust showed up quickly on some samples, making our job pretty easy.



Enjoy
Fine Woodworking...
Your Way!

Choose how
you want to enjoy
our magazine

Print magazine +
FREE tablet editions

Just \$34.95 a year

Subscribe today at
FineWoodworking.com/subnow

Save
UP TO
39%*



Tablet editions only

\$6.99 for 2-month
subscription,
\$7.99 for single issue,
or \$34.99 a year

Join today at
FineWoodworking.com/appinfo



Fine
WoodWorking®

*Savings on U.S. newsstand price. Tablet editions available for iPad, iPhone, Windows Surface Tablet, and Android tablets, with more formats coming soon. For more information visit FineWoodworking.com/appinfo. Questions? U.S. & Canada customers, call 866-469-0779, International customers, call 203-702-2232, M-F 9am-5pm ET or email Customer Service at: support@customerservice.taunton.com

© 2013 The Taunton Press

WOODWORKERS MART

Create Moldings With Your Table Saw
With Corob Molding Knives & Shaper Cutters
Over 45 Shapes Available
Molding Knife Heads fit standard table saws
with 5/8" arbor. Knives are also compatible
with Delta heads, and other old style heads.



1-800-745-9895
corobcutters.com
MADE IN USA

Masterpiece School of Furniture
Visualize. Learn. Design. Create.

Let our internationally renowned instructors
mentor you from proficiency into mastery.

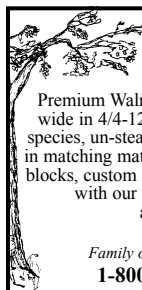
Marysville, CA • masterpieceschool.com

Woodworkers love these ads!

Put your ad here
in the next issue.

Call 800-309-8954

Fine
WoodWorking



Groff & Groff Lumber, Inc.
Quality Hard Wood Lumber Sales
www.groffslumber.com

Premium Walnut, Cherry and Maple Planks up to 40"
wide in 4/4-12/4 thick, 75+ unusual native and exotic
species, un-steamed Black and English Walnut available
in matching material 4/4-8/4 thickness, Burls and turning
blocks, custom flooring and wainscoting, custom sawing
with our 42" mill, view our price list online
at www.groffslumber.com
No Orders Too Small

Family owned and operated for 3 generations
1-800-342-0001 • 717-284-0001



Hold it square



www.jevonstoolco.com
913-384-0023



THE BEALL TOOL CO.

541 Swans Road N.E. Newark Ohio 43055
1-800-331-4718 www.bealltool.com Dpt. FW



Max Strength = Maximum Control



Get Control with the Strongest,
Stiffest Fret Saws on Earth
Available in Titanium or Aluminum

www.knewconcepts.com

Fine
WoodWorking

Get your message in front of
woodworkers that spend an average
of 10 hours a week in their shop.

Advertise Here!

Call 800-309-8954

SIMPLE
DOVETAILS

No trial and error adjustments.
Order your Keller Dovetail System now!
(800) 995-2456

Made in the USA since 1976 • DVD/Video \$8.95 + \$2 p/h

www.simpledovetails.com

THE BEST OF THE BEST

We picked CRC Industrial 3-36 from the top seven performers as the Best Overall because it worked well on both cast iron and tool steel and did not leave an objectionable sticky or slick residue on the chisel. However, it does have a petroleum odor. Though the smell dissipates, some may find the spray offensive to use on hand tools. For those people, we recommend using the CRC for machines and Moovit for hand tools.

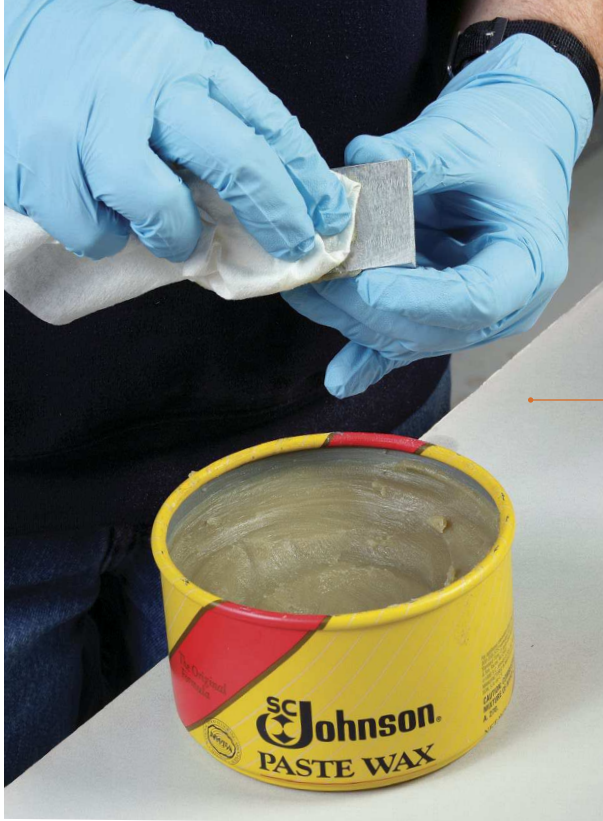


10 days of hell

We tried the rust preventers on a cast-iron tablesaw top and some samples of A2 tool steel (an iron alloy) and subjected them to extreme environments. The rust came on strong. We started seeing it on the tablesaw top after only one night, and on the tool steel within 48 hours. After 10 days, it was clear which products were working.

The top seven performers were CRC Industrial 3-36, LPS 3, Moovit, Rust Block, WD-40, WD-40 Long-Term Corrosion Inhibitor, and 3M Rust Fighter 1. However, a rust preventer is useless if it interferes with your work. So we did further tests so see if any of the top picks would discolor wood, or interfere with finishes or glue adhesion. We applied the top six products to A2 steel samples, rubbed them across some sample boards, and applied oil- and water-based finishes on top of the boards. None showed any discoloration of the wood, and there were no problems with finish adhesion.





FAMILIAR PRODUCTS FADED FAST

Waxes and natural oil-based products have often been touted as rust preventers on machines and hand tools. But they didn't fare well in our testing.

WAXES WANED

Waxes work well as lubricants, especially on the bottoms of planes and on machine tops, but they don't offer much protection against rust.

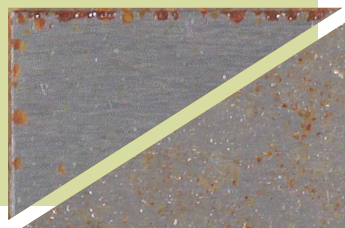
OILS SLIPPED UP

Camellia and Jojoba oils are natural products (made from vegetable oil), so they have a pleasant odor. That quality is partially why they are used often by hand-tool aficionados as a protectant. But in our tests, the products were marginal performers.



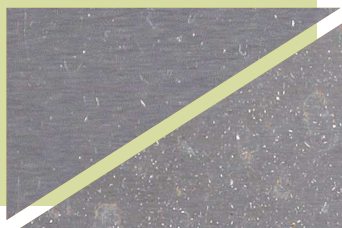
JOJOBA OIL

\$12 (8 oz.)



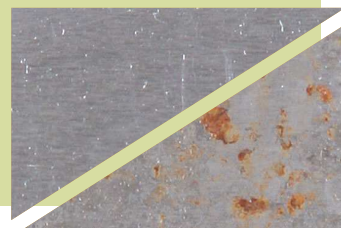
LPS 3

\$15 (11 oz.)



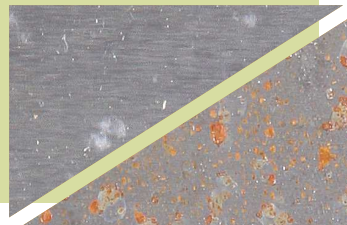
MOOVIT

\$10 (10 oz.)



RUST BLOCK BY EVAPO-RUST

\$9 (16 oz.)



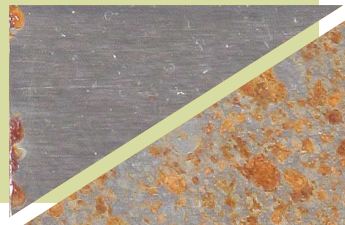
RUSTERIZER ARMOR

\$16 (32 oz.)



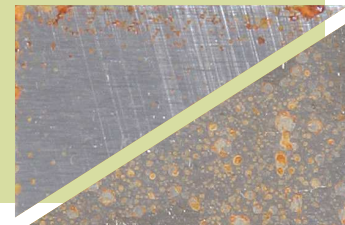
RUST-OLEUM STOPS RUST RUST INHIBITOR

\$7 (10.25 oz.)



SC JOHNSON PASTE WAX

\$7 (16 oz.)



WD-40

\$5.50



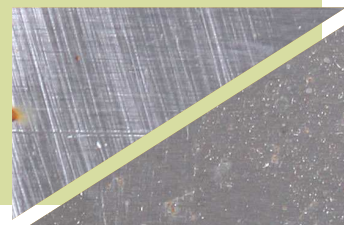
WD-40 LONG-TERM CORROSION INHIBITOR

\$16 (6.5 oz.)



3M RUST FIGHTER-1

\$21 (18 oz.)



Other ways to manage moisture

Last, to find out if any products left an objectionable residue on hand tools, we applied them to some chisels and then basically felt them, comparing an untreated chisel with the treated ones. The CRC Industrial 3-36 and Moovit were the favorites here. Each of these products were very close in feel to the untreated chisel. We also applied the products to a jointer table and gave them a feel for any objectionable residue. Most of the products left a slick surface on the cast iron, a plus for machine tables. The only two that left a visible and tactile residue were 3M Rust Fighter 1 and LPS 3.

The best defense

Two products, 3M Rust Fighter 1 and LPS 3, performed perfectly in both torture tests, but we didn't like the sticky feel of the coating that both left behind. Other products did well on one steel but showed kinks in the other. In the end we picked CRC Industrial 3-36 as Best Overall. If you prefer a non-petroleum product for your hand tools, we recommend Moovit.

But the best defense against rust has multiple prongs. Aside from weatherproofing and heating the shop, we also recommend using a dehumidifier to help control moisture. And because none of the products we tested can be applied to the inside of power tools (rust can degrade motor components), we recommend keeping desiccants or corrosion inhibitors in tool cases. □

Thomas McKenna contributed to this article.



Solutions for enclosed spaces. Volatile corrosion inhibitors (VCIs) and desiccants help prevent rust in drawers, tool cases, and cabinets. VCIs form a protective coating on tools while desiccants draw moisture from the air.



Dry the air. You also can curb moisture with a dehumidifier—just remember to empty it regularly. For basement shops, a masonry waterproofing paint keeps moisture from migrating through the porous concrete walls. Garage floors should be sealed as well.



The wipe-on or spray products we tested aren't the only weapons available in the battle against rust. Aside from heating the shop or using a dehumidifier, two other options are desiccants and volatile corrosion inhibitors (VCIs). These products prevent corrosion of critical components in contained spaces, such as boxes, drawers, and cabinets. Each does the job differently.

Desiccants are made from a number of porous minerals, including calcium and silica, as well as manmade

compounds. They help prevent rust by removing moisture from the air via the process of *adsorption* (vs. absorption). When a substance is adsorbed, it remains separate from its host, which essentially works as a storage drum. And that storage area is limited. A desiccant compound can become saturated, or full.

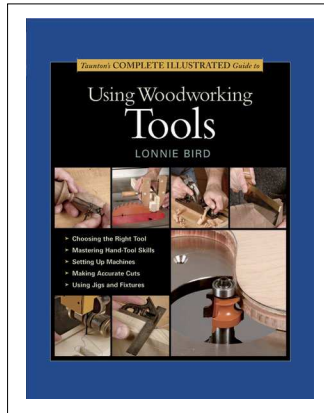
Some desiccants, such as silica and a few calcium-based products, can be recharged, or reactivated, with heat to remove the stored moisture and used again.

VCIs emit molecules that settle on metal surfaces, forming a protective layer that repels moisture. VCIs are made by a number of manufacturers from proprietary chemicals and often are infused into a porous carrier material, such as foam. They are disposable and cannot be recharged—some last six months, others work for up to five years.

Desiccants and VCIs both are designed to work in enclosed spaces, and you purchase them based on the square footage of that space. To get the most protection from both products, the storage space needs to be as airtight as possible. If a drawer is left open, the protective tool coating emitted by a VCI will dissipate, while a desiccant will become saturated quickly.

See what the publisher of ***Fine Woodworking*** has in store

Books, ebooks, magazines, special issues, DVDs, and more

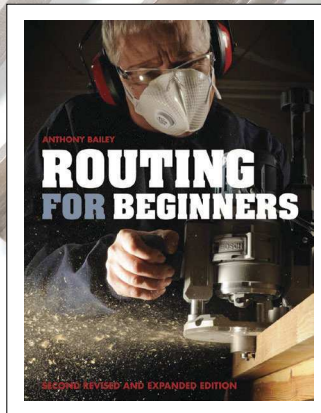


COMPLETE ILLUSTRATED GUIDE TO USING WOODWORKING TOOLS

Hardcover, Product #070729, \$39.95

eBook, Product #077982, \$27.99

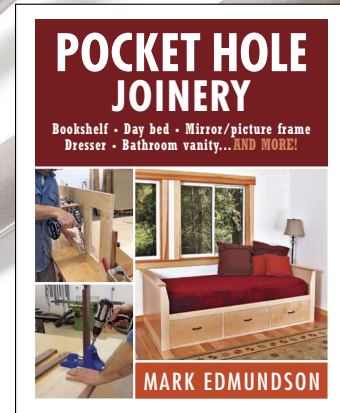
A Taunton Press Title



ROUTING FOR BEGINNERS

Paperback, Product #GM0149, \$24.95

A Guild of Master Craftsmen Title



POCKET HOLE JOINERY

Paperback, Product #071463, \$24.95

A Taunton Press Title

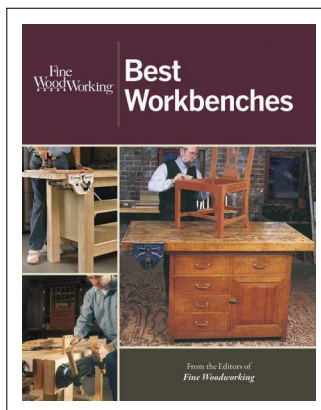


TABLESAW TECHNIQUES

DVD, Product #061127, \$19.95

Video Download, Product #067137,
\$19.95

A Taunton Press Title



BEST WORKBENCHES

Paperback, Product #071344, \$21.95

eBook, Product #077621, \$17.99

A Taunton Press Title



ESSENTIAL TOOL CHEST

Printed Plan, Product #011284, \$19.95

Digital Plan, Product #065150, \$12.95

A Taunton Press Title

Shop online anytime

www.TauntonStore.com/shopfw

Order by Product number. Phone orders: 800-888-8286 or
203-702-2204 international. Call Monday-Friday 9AM - 9PM ET,
Saturday 9AM - 5PM ET. Use code M1800155.

**Taunton
STORE**

You can also purchase our products from these providers:



STANLEY®
FATMAX®

POUNDS NAILS NOT ARMS

STANLEY® FATMAX® ANTI-VIBE® HAMMERS

The Stanley® Anti-Vibe® Technology isolates vibrations to the hammer's head, minimizing the strain on your arm. The steel core adds durability, shock resistance, and overstrike protection, while the FatMax® Composite Handle with Head to Handle Assembly guarantees the nail is the only thing being pounded.

