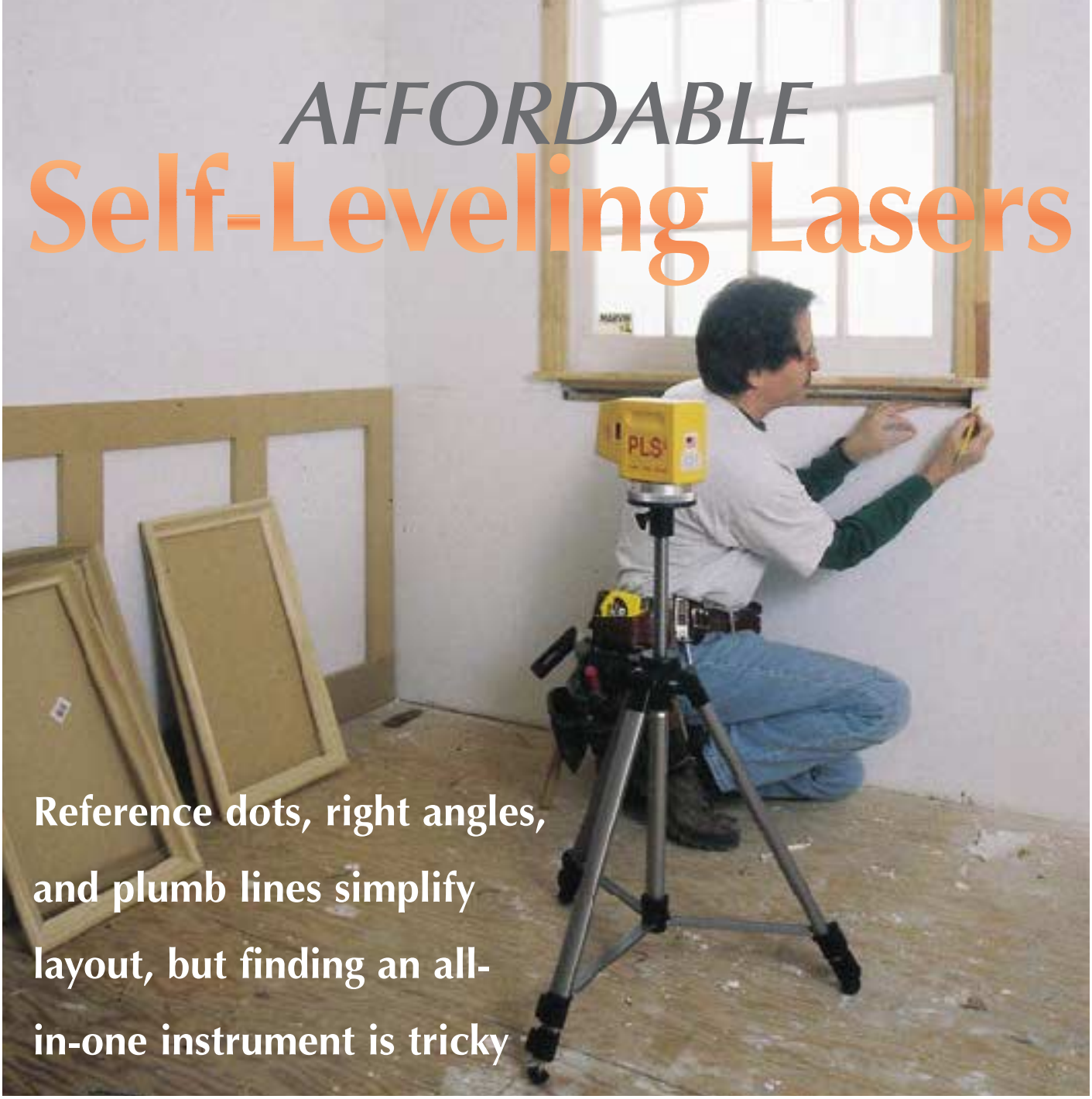
AFFORDABLE Self-Leveling Lasers



Reference dots, right angles, and plumb lines simplify layout, but finding an all-in-one instrument is tricky

by Gary Katz

I've been wanting to buy a laser level for several years now but, out of all the lasers on the market, I've been unable to decide which one would be right for me. There are many potential applications for a laser in a carpenter's routine, and just as many questions to answer in order to choose one instrument that's equal to all of these tasks.

Do I want a tool that shoots horizontal or vertical lines, or one that does both? What about one that projects two lines simultaneously at 90 degrees to each other? And what about dots? I definitely want plumb dots, but for horizontal applications, would I be better off with dots or lines? I can have either one with a 90-degree projection option, but do I want an instrument with a revolving dot instead?

As luck would have it, I was given the challenge of writing this review. It was probably the only way I was ever going to pick the right laser for my work, so that's what I set out to do.

During the course of my research, I discovered that — even among the mountain of lasers on the market — there is no perfect tool, although there are several close calls. A complete review of all the lasers available today would be nearly impossible, so I limited this article to covering self-leveling, non-rotating lasers that retail for no more than $600. (We'll look specifically at rotating lasers in a future article.) I also limited the coverage to tools that fit the needs of the general trades — carpenters, plumbers, electricians, hvac technicians, drywallers, and so forth.

In Search of the All-Purpose Laser

No matter which trade we're in, most

of us would like a laser that performs a variety of similar functions. A level dot or line for laying out items such as cabinets, wainscoting, electrical boxes, and drain lines is surely a must. A split dot that projects a 90-degree angle is great for all kinds of squaring-up jobs. A plumb line that connects the floor, wall, and ceiling is extremely useful for accurate framing, jamb installations, and locating structural beams, deck piers, and recessed ceiling lights. Matching right-angle lines simplify the installation of flooring, tile, and decorative ceilings. And most of us would like our bright new laser to replace that old, spinning, swaying plumb-bob.

Dots and Lines

Right from the start, I had a hard time deciding between dot lasers and line lasers. Until recently, I thought that line lasers were best for use by flooring and ceiling installers, but these instruments are just as useful in other applications. A horizontal line is easier and faster to work to than a dot: No dot can match the usefulness of a line cast straight across the floor, up the wall, and back across the ceiling, plumb to its point of origin.

Unfortunately, the visibility of the line deteriorates rapidly as projection distance increases. Line levels are excellent in smaller rooms, like kitchens, closets, and bathrooms, cast on walls that are within 20 feet of the instrument. But lines aren't easily visible in brightly lit rooms or large rooms where the line must be cast farther than 30 feet. And the line levels I tested were not acceptable for exterior use at all.

Likewise, most dot levels are barely visible outdoors. But there are significant differences between individual dot lasers. Some tools have only one horizontal dot, while others employ a prism to split the laser and create two horizontal dots — the second dot at a right angle to the first. Other tools project three horizontal dots, all at perfect 90-degree angles. One thing that most dot lasers have in common is that they shoot plumb dots — up, as well as down.

Judging Quality

There are several characteristics that affect the quality of a laser. I graded each tool by the following criteria:

Dot size. Dot size varied dramatically from tool to tool, from 3/32 inch to 1/4 inch, but seemed to grow smaller as the price increased. Several manufacturers suggested that dot size wasn't that important, and that users should simply measure to the "center" of the dot. But finding the exact center of an extremely bright, sometimes fuzzy red dot can be difficult. For that reason, the smaller the dot, the better.

Dot clarity. Some manufacturers tout the brightness of their dots, while others claim that their dots are sharper than the next guy's. Both are subjective claims, relating to the clarity of the dot: Like the focus on a slide projector, some dots appear fuzzy, while others are tack sharp. Sharp dots tend to travel longer distances without degradation. Sharp dots are also easier to work with and ensure greater accuracy. I graded dot clarity on a scale of 1 (worst) to 10 (best).

Self-leveling. Although all the instruments in this review are self-leveling, I discovered that some dots moved out of level when the tool was jostled or moved. I therefore tested each tool for "constant" self-leveling. After placing the tool on a perfectly level surface and aligning the dot with a premeasured fixed point, I gradually shimmed the tool out of level until the laser beam or the safety light blinked or the instrument shut off. I measured the accuracy of the dot just prior to safety shutoff, and I measured the size of the shim that produced safety shutoff.

Dampening. I relied on subjective terms to evaluate the sensitivity of the pendulum dampening system (described below) in each tool, and how quickly it controlled a dancing dot. Systems that brought the dot to rest quickly were graded *Good*; I gave a grade of *Fair* to those that allowed the dot to dance in 8- to 10-inch orbits around the target as I walked across the floor of my raised-foundation home. A dot that jumped violently, skittered around the target, and remained nervous after I'd walked across the floor, earned a *Poor* rating.

Pendulum lock. Self-leveling lasers calibrate and correct themselves via a swinging pendulum mechanism. The pendulum levels the tool quickly, which saves considerable setup time. Most of these tools will self-adjust if the work surface is within approximately 5 degrees of level.

The pendulum system is so sensitive that several manufacturers include a pendulum-locking mechanism on their unit to safeguard the delicate instrumentation during travel, repositioning, and storage. Other manufacturers implied that a pendulum lock wasn't necessary for their tool.

Accuracy

Before testing any of the laser units, I set up my transit in my living room and established three reference points. I shot two opposing points across the longest distance (20 feet) inside my house, and, for each, I marked a fine ink line on masking tape, exactly at the cross hairs. For testing accuracy over a 50-foot distance, I opened the French doors in my living room, swung my transit, and marked the cross hairs by driving a 6d finish nail into a tree in my back yard. I checked the accuracy of these marks by relocating the transit in a second position and shooting all three positions again. The error factor was no more than 1/16 inch. (Although my transit is much more accurate than any $600 laser level, it takes longer to set up, occupies too much space in my truck, and can't shoot plumb lines or project reference points. Lasers have advantages in these areas.)

To test the lasers, I used a Stabila elevator tripod equipped with a rotating base. I leveled the mounting plate with a spirit level, then adjusted the elevator to align each of the lasers in turn with the first mark at the end of my hallway. Next, I rotated the tool to check the second mark and, finally, to the nail in my rear yard. To double-check the results, I moved the tripod to a second location and tested each tool again.

DOT LASERS

LeveLite Pro

The LeveLite Pro ($420) projects three dots: one horizontal and two plumb. An adjustable-height foot allows the instrument to sit on the floor and project a downward dot.

This unit gives a sharp 1/8-inch dot at 20 feet; at 50 feet, it was still sharp — earning a rating of 8 — and only slightly bigger, at 3/16 inch.

At both the 20-foot and 50-foot distances, the dot was right on target. The Pro has fair dampening action and no pendulum lock. With the unit shimmed to 5/16 inch, the dot blinked but remained level on target.

LeveLite Tri Lite

This tool ($550) has almost all the requisite dots — one horizontal, one right-angle, and one plumb dot up — but lacks an important one: It won't shoot a plumb dot down. An easy-to-lose plastic accessory tool must be used to locate and transfer the position of the plumb dot to the ground. The locating tool can be used only if the instrument is positioned on the ground, not on a tripod. The Tri Lite's dot also isn't nearly as small or clear as that of other units; at 20 feet, the 3/16-inch dot was blurry. The dot grew slightly to 1/4 inch at 50 feet.

At a distance of 20 feet, the level was right on, and it was only 1/16 inch off at 50 feet. The dot rated a 5 for clarity; dampening action was poor. The Tri Lite has no pendulum lock. The unit blinked when shimmed out of level by 5/16 inch, but the dot remained level.

PLS-3

The PLS-3 ($395) projects three dots: one horizontal and two plumb dots (up and down). The unit's base is offset to allow dot projection on the floor with the unit placed on the floor.

This tool doesn't have a right-angle dot, but it makes up for that minor shortcoming with its small, clear dot and dependable accuracy.

I understand that the original PLS can be tilted and used to shoot a sloped line for stair railing or other angled layout. But none of the tools I evaluated could be used for that purpose, due to their "anti-tilt" safety feature.

The PLS-3's dot didn't vary from its 3/16-inch size at 20 feet or at 50 feet; at a distance of 20 feet from the target, the dot was right on, and it was only 1/16 inch off at 50 feet. The unit has no pendulum lock, but has good dampening and a dot clarity of 8. Tilted with a 3/16-inch shim, the unit blinked and shut off, but the dot remained level.

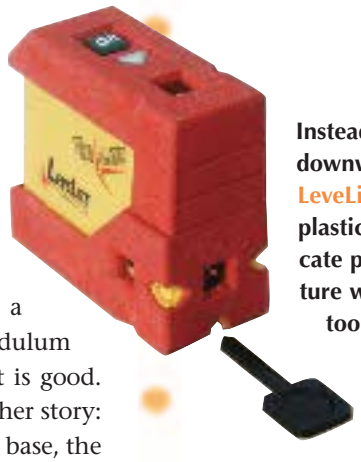
PLS-5

This tool ($595) is the Cadillac of multi-use lasers and fits all the necessary requirements for general trade use. As indicated by its name, it has five dots: one horizontal dot plus two more at right angles, and two plumb dots. The instrument's base is elevated to provide on-the-floor downward dot projection. The right-angle horizontal dots are offset 1 inch from the plumb dots. The dot is small, clear, and accurate, even over a 50-foot projection. The pendulum dampening on this instrument is good. The self-leveling feature is another story: With a 1/2-inch shim under the base, the laser shut off, but not before allowing the dot to drift off level by 5/16 inch at 20 feet. The manufacturer claims that the instrument will self-level each time it is set up. But if you bump or tilt the instrument after initial setup, I wouldn't count on its accuracy. Instead, I'd cycle it off and back on, forcing it to self-level again before continuing. The dot rated an 8 for clarity, and maintained its size of 3/16 inch at 20 feet and 50 feet. It was dead on target at 50 feet. The PLS-5 has no pendulum lock.

Robo Laser

The Robo Laser ($350) has only one dot, but the dot can be gradually moved from point to point by means of a small remote control device, which is especially handy for laying out cabinets, wainscoting, or other continuous level lines. Although the Robo Laser isn't a true "rotating" laser — that is, it doesn't

A thumb dial raises the built-in elevator foot of the LeveLite Pro, allowing you to read the downward plumb dot with the unit resting on the floor.



Instead of projecting a downward plumb dot, the LeveLite Tri Lite relies on a plastic locator tool to indicate plumb center. This feature works only with the tool resting on the floor.

Pacific Laser Systems's PLS-3 features three dots: one level and two plumb. The PLS-5 adds two more dots at right angles.

The Robo Vector (above) and Robo Laser (below and left) can be purchased as a kit to handle a variety of layout applications. Though not a true rotating laser, the Robo Laser's dot can be moved slowly by remote control.

Stabila's Compact Laser projects both a level dot and a vertical line. An optional prism splits the dot into a 90-degree beam.

cast a continuous line around a room — when used with an elevator tripod, this instrument can save an enormous amount of layout time. The dot was a consistent though fuzzy 1/4 inch at both 20 feet and 50 feet. Dot clarity rated a 7. The dot was 1/16 inch off at 20 feet and 1/8 inch off at 50 feet.

The unit features fair dampening and a pendulum lock. The dot blinked with a 1/4-inch shim but remained level.

Robo Vector

This unit ($250) features five dots: One horizontal, two more at horizontal right angles (left and right), and two plumb dots (up and down). The base of the instrument swivels to allow it to rest on the floor while projecting a downward plumb dot. The Robo Vector is affordable and has all the necessary dots, but is a poor performer when it comes to dot size: At 20 feet, the dot measured 1/4 inch, and at 50 feet, almost 5/16 inch. The dot was off by 1/8 inch at 50 feet, but it was difficult to ascertain because the dot was so big. I gave this unit a 3 for dot clarity.

After shimming the unit out of level by 3/8 inch, the dot still seemed level (but, again, hard to tell). The dot blinked when the shim exceeded 3/8 inch.

The Robo Vector offered poor dampening — when my dog walked by on the wood-framed floor, the dot bounced around for a while before stopping.

Stabila Compact Laser

This instrument is in a category by itself because it features one dot and one line, and has an optional detachable prism. With the rotatable prism attached, the dot can be split to shoot right angles. However, the dots shot through the prism are not level to each other or to the original dot. Therefore, the prism can't be used to shoot 90-degree level lines, nor is it calibrated to shoot plumb points. Aside from these limitations, the Compact Laser ($350, $430 with prism) is an accurate level with a small, clear dot — 3/32 inch at 20 feet and at 50 feet — and has the best dampening system (both dot and line) of any of the instruments evaluated. But the vertical line is no replacement for plumb dots, and the visibility of the line is also the weakest of the three line lasers I tested.

The dot was off level by 1/8 inch at 50 feet. The instrument has a pendulum lock, and earned a top rating of 10 for dot clarity. The dampening action is good, and when shimmed off level by 3/8 inch, the dot blinked. However, even when I increased the shim to 7/16 inch, the dot remained on the mark at 50 feet.

LINE LASERS

Designing a testing regimen for line levels was more difficult than judging the dots. Ultimately, I simply checked each instrument against my tried-and-true 8-foot Stabila spirit level. All three instruments (four including the Stabila Compact Laser) shot perfectly plumb vertical lines. The two Gizmo lasers also shot horizontal lines, which I checked against my transit.

Plumb Pyramid

When I unpacked this little tool, I almost set it onto the "don't test" pile, because it rattled and had a "disposable" feel to it. This is the least expensive tool tested, which may account for its slightly weaker dampening system.

Even though it's called a "Plumb," the Pyramid ($120) will only shoot a vertical line on a wall, and can't be used in place of a plumb bob in the center of a room. However, this unit throws the brightest line of all the vertical-line lasers. The line is a little wide for my taste, almost the thickness of two chalk lines, but I was able to see it clearly in a bright, sunlit room from a distance of 20 feet.

Gizmo II & Gizmo III

These two tools have slightly different functions, but I've combined them because the quality of the lines is identical. The Gizmo II ($348) has two buttons, one to select a vertical line and one to select a horizontal line. Both lines may be projected singly or together from the same prism window. Projected together, the lines create oversized cross

hairs on a vertical surface. The cross hairs are great for laying out wall tile or simultaneously plumbing and leveling, as when installing a series of doors or windows.

With the unit set up on a tripod or tension pole, the horizontal line can simultaneously wrap two parallel walls and one end wall. The vertical line will wrap the floor, wall, and ceiling.

The Gizmo III ($448) has two buttons, and also includes a second window for a 90-degree vertical line. To demonstrate the convenience of this feature, I positioned the unit to shoot one line down the center of my entry hall, then simultaneously shot a second line down the center of the perpendicular bedroom hallway. The entire process took a matter of seconds. To use a tape measure and chalk line for the same purpose would require four hands and a lot more time, especially to locate ceiling lights, beams, and door openings — proof that lasers are efficient and useful job-site tools.

Some friends of mine who install tile professionally use a Gizmo to set up for many of their installation routines. However, they report that using the laser as an always-on electronic replacement for a chalk line has proved disappointing. They have found that the instrument is overly sensitive to movement and vibration. Every time they walk past and disturb it, they have to recheck the layout for accuracy. And making fine readjustments is nearly impossible, because the dampening system is so basic. The best use of this, or any laser unit, appears to be as a temporary reference to establish more permanent, fixed chalk lines.

The Ultimate Laser: Still Searching

After working with more than a dozen different lasers, I found that no single instrument will perform all the tasks I need. It's not a matter of accuracy: I believe that most of these instruments are accurate enough for all interior work. (Accuracy within 1/8 inch over 30 feet is good enough for me.)

The real case against lasers is simple: To provide us with the Perfect Laser, these manufacturers need to consolidate their disparate viewpoints, get the dots and lines together, and construct a harmonious piece. I'd like mine to shoot bright, fine, horizontal, and vertical lines, and plumb dots — both up *and* down. I'd like to see a unit that's as accurate, durable, self-leveling, and dampening as the Stabila Compact Laser, yet shoots vertical *and* horizontal lines like the Gizmo III, and plumb dots to boot.

In the meantime, if you're like me (and many tradespeople I've spoken with about lasers) and you just can't wait, you'll have to buy two tools.

One way to stay well within a $600 limit is to buy a Robo Vector and Robo Laser combination kit — a somewhat cumbersome collection — then live with the underdeveloped dampening system and the large fuzzy dots. In exchange, you'll get a handy, remote-controlled horizontal dot. I decided instead to break the bank and buy a pair of more reliable and useful tools. For vertical, horizontal, and square lines, I chose the Gizmo III and, for plumb and level dots, I went with the PLS-3.

The Plumb Pyramid casts a plumb reference line onto a vertical surface.

The Gizmo II and III lasers project plumb and level lines, singly or combined, making them handy for grid-type layouts. The Gizmo III features a second prism window that projects perpendicular vertical lines.

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Laser Manufacturers

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Watseka, IL 60970
815/432-5237
www.cstsurvey.com
Gizmo II & Gizmo III

LeveLite Technology
476 Ellis St.
Mountain View, CA 94043
650/254-5980
www.levelite.com
LeveLite Tri Lite, LeveLite Pro

Pacific Laser Systems
449 Coloma St.
Sausalito, CA 94965
415/289-5780
www.plslaser.com
PLS-3, PLS-5

Stabila
332 Industrial Dr.
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800/869-7460
www.stabila.com
Stabila Compact Laser

Toolz
404 Villa St.
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Robo Laser, Robo Vector

Zircon Corp.
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Plumb Pyramid