

Selecting a Bow Sight



A bow sight is a device that's mounted on the riser of your bow that helps you to aim your arrow. Much like the bead at the end of a shotgun barrel, the bow sight simply helps tell you where your projectile is pointed.

Though it is possible to shoot your bow without a sight¹, doing so is very difficult, especially at longer distances.

As such, virtually all modern compound bows are outfitted with some kind of sight. Used in conjunction with a peep-sight or kissar-button and a quality arrow rest, even novice archers can be surprisingly accurate.



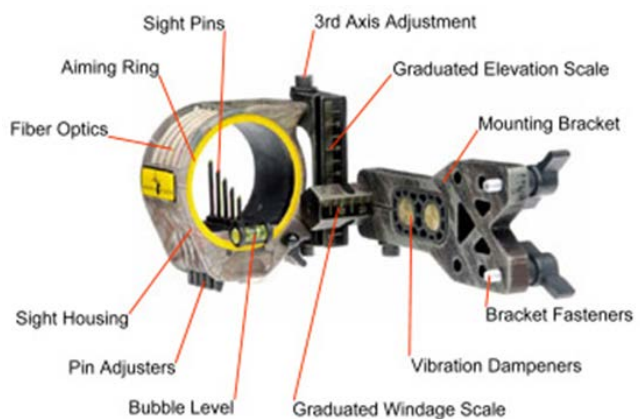
*Note 1: The IFAA recognises four bow styles that are shot without the use of a sight:
Bare bow (Recurve and Compound): Bowhunter (Recurve and Compound)
Longbow and Historical Bow.*



Some bow sights are quite simple, like the one on the left. This is an example of a straightforward fibre-optic 3-pin composite (plastic) sight, with a Lexan pin guard, and twin pin tracks. Each pin can be positioned up or down in its track for elevation adjustments and each pin can be screwed in and out of the mounting bracket for windage adjustments.

This type of sight is very functional, isn't too difficult to adjust, and would be sufficient for most hunting and recreational applications. This type of sight is cheap and easily installs with just two allen head screws.

But as you might expect, sights come in a variety of styles and levels of sophistication. The second sight shown here is quite different - a rather complex sight with many added features. This machined aluminium and composite sight offers gang-adjustments (all pins can be moved at once) for windage and elevation, as well as adjustments for each individual pin.



This sight also incorporates more fibre-optics, vertical pin technology, a subliminal aiming ring, an anti-vibration device, camouflage finish, graduated scales, "no-tools" cam adjusters, pin lights, drilled and tapped quiver mount, and 3rd axis (torque) adjustments. In short, this type of sight is "loaded" with some premium features. Of course, these premium features don't come cheap. This sight considerable more than the first sight, and there are plenty of models even more advanced than this one. High-end competition sights can cost as much as 10-15x more than the first sight.



Note: The pin sights that are shown above are used in the IFAA Bowhunter Unlimited and Limited styles. Note that these styles may not use a bubble level as shown in the bottom picture and they should be taped over for IFAA sanctioned tournaments.

Major types of bow sights

Fixed-Pin Sights.

A fixed-pin sight is the most common type of sight, and the popular choice of hunters. A fixed-pin sight usually has 3 to 5 individual pins¹, which can each be set for a particular known distance. The top pin is for the closest distance, the lower pins are for longer distances. Once set, the pins are tightened and remain “fixed” in position during use. Setting up and adjusting a fixed-pin sight is pretty simple, but it does require some trial and error testing. And for those shooters who take their time, and set each pin just right,

the fixed-pin sight yields excellent results - as they’re very reliable and easy-to-use in the field.



Note 1: The IFAA requires 4 or 5 pins to be mounted on the sight to qualify for the bowhunter classes.

Most archers set their fixed-pins for easy-to-remember distances, usually in 5 or 10 yard increments. Once the pins are set, shooting known distances is a snap. If your target is 30 yards away, you simply sight the bow by placing your pre-set 30-yard pin on the intended target and then shoot. The sight does all the compensation for the change in the arrow’s trajectory. But the tricky part comes when shooting unknown distances, as you must be able estimate the actual distance to the target, and choose the best pin for that distance. Mastering the skill of yardage estimation isn’t so easy, especially when shooting from an elevated position, over uneven ground, or through dense foliage. But it’s a skill every archer needs.

If you set your pins for 20, 30, 40, 50 and 60 yards, there’s little chance that the target face or 3D target stands precisely at one of your pre-set distances. So in addition to accurately estimating yardages, a fixed-pin shooter must learn to compensate as necessary for intermediate distances for which no pin is set.

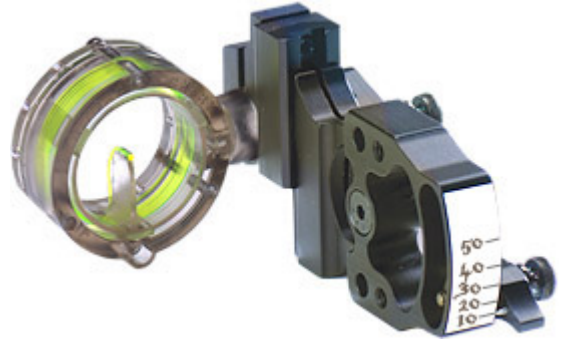
If your target is 25 yards away, your 20 yard pin will shoot a bit too low - your 30 yard pin too high. So most fixed-pin shooters must learn to split the difference and hold somewhere between the pins, known as “gap-shooting”.

Moveable-Pin Sights.

A moveable pin sight is a little different. Rather than have multiple pre-set pins, a moveable pin sight usually has a single pin, which is adjusted before each shot. The moveable pin sight has a system of brackets, levers, or worm gears that smoothly slide the entire sight housing up and down, so the pin can be adjusted for any distance in just a few seconds. At the rear of the sight bracket, a small adjustable pointer indicates the yardage along a graduated scale or a series of handmade marks on white tape. Each mark represents a known yardage. So if you

come upon a target which is 30 yards away, you simply move the pointer to the 30 yard mark and shoot.

Unlike the fixed-pin sight with individual pins set for specific distances, the moveable pin sight can be adjusted to any distance just by moving the pointer. The user can have as many references (distance marks) as he or she wishes. In fact, providing you had enough patience and a sharp enough pencil, you could make a mark for every yard.



Realistically, most moveable pin shooters make their yardage marks in typical 5 or 10 yard increments, and then use some system of compensation for intermediate yardages - much like a fixed-pin shooter. A typical moveable pin sight might be setup with marks for every 5 yards. So if your target is 27 yards away, you must adjust your pointer so that it is between the 25 and 30 yard marks. This system is actually quite accurate, as it allows yardages to be carefully adjusted on a scale, before the bow is ever drawn back. As such, moveable pin shooters often have an advantage over fixed-pin shooters. In fact, the IBO and ASA have separate competition classes for shooters using fixed-pin vs. moveable pin sights¹.



Note 1: In IFAA tournaments movable pin sights may not be used by archers in the Bowhunter styles. An archer using such sight will be re-classified as being a "Freestyle" competitor.

Target Competition Sights (3D, Field archery, Target archery)

A Target Sight is a specialty sight which is designed for use in competition. Due to the size, cost, and complexity of these sights, they are rarely used for hunting - but they are arguably the most accurate sights available.

This Sight is essentially a fancy Moveable Pin Sight with a sophisticated system of windage and elevation click-adjustments. Target sights are larger too, usually mounting 6-12" forward of the bow's riser via a quick-disconnect dovetail system.

Target Sights usually have a 10/32" threaded receiver which will accept a variety of aiming points (single pin, a scope-style sight, laser sight, etc.) which are all sold separately. Once accessorized and properly setup, this type of sight is amazingly accurate. But obviously, this sight isn't for everyone either.



A good quality Target Sight with a quality scope and magnifying lens can be very costly. These advanced sighting systems are very well designed and are manufactured to the most exacting tolerances.

But their usefulness is limited to applications where this type of precision is necessary.

Fixed-Plate and Dovetail Mounts:

Most sights are the fixed-plate design, meaning that the sight bracket is attached directly to the bow. A fixed-plate sight is generally mounted on the bow with two allen screws and the entire bracket and sight remain on the bow at all times. A dovetail mount is a little different. A dovetail sight works by mounting a separate small retainer bracket to the bow, which has a dovetail groove machined into it. The sight is fitted onto a separate extension bracket which is machined to fit the dovetail groove. To put the sight onto the bow, you slide the extension bracket into the retainer bracket and tighten some type of retaining nut (usually a large thumb screw). So the dovetail mounted sight comes on and off the bow very easily. The fixed-plate sight does not.



As a general rule, hunters prefer the simplicity and reliability of the fixed-plate design. And it stands to reason, as there's typically no need to repeatedly take a sight on and off of a hunting bow. However, 3D and competition shooters often prefer the dovetail mount. A dovetail mount will allow the use of multiple sights - presuming they all share the same brackets.

A serious competition shooter may use more than one sight (different sized pins, different magnifications, a back-up sight, etc.) and the dovetail mount makes changing the sights a snap. Also, dovetail sights tend to be longer - positioning the pins further away from the shooter for increased accuracy in competition. Of course, a bow outfitted with an extra-long sight generally doesn't fit into a standard bow case - so the sight must be removed after each use before the bow can be put away. In that respect, a dovetail mount is a very handy feature for long competition sights.

Major sight features



Fibre optic technology is primarily designed to carry digital information over long distances. But the hunting and shooting industry has found another use for this remarkable product. At the core of a fibre optic cable is a strand of optically pure glass or plastic. Surrounding the optical glass is a special coating called the cladding, which reflects the light back into the core. So when the translucent cable is exposed to sunlight (or any other light source), light gets effectively "trapped" in the core of the cable. At the end of the cable, where the core is exposed, the light is able to escape.

This creates a wonderful phenomenon that makes the tip of the cable appear to light-up - as if powered by a battery.

And the longer the fibre-optic cable, the more light it can gather and the brighter the tip becomes.

In the archery industry, these fibre optics cables have been put to use - not for data transmission - but as a sighting device. The small bright tip of a fibre optic cable makes an

excellent aiming point on a bow sight. Even in low light dusk & dawn conditions, the tip of the fibre optic cable still stands out clearly - allowing the archer to aim and fire his bow.



Most of today's hunting sights are outfitted with some kind of fibre-optics pins. Most fibre optic sight pins have between 1/2" and 2" of fibre optic cable, usually situated behind the pin or wrapped around the base of sight pin. And this seems to be enough to provide an adequate increase in pin visibility. But a few manufacturers take the concept to the extreme - designing sights to specifically incorporate huge amounts of fibre-optic cable.

The sight on the left uses 24" long fibre optic cable coils for each pin. This produces a remarkably bright pin that practically glows in the dark. But before you choose this type of sight, be warned that you can have too much of a good thing.

It may be possible for a pin to be **too** bright. Ultra-bright pins can often create a halo or starburst effect that can be very distracting - akin to looking into a bright light. As such, we recommend you choose pins that have reasonable amount fibre optics.

Sight pins come in a variety of sizes; the most common are the .019", .029", and .040" pins. The smallest pins are the micro-fine .019" pins, available as an option on many of today's popular sights. These tiny pins allow for very fine shot placement with minimal loss of sight picture. However, tiny pins can be difficult to see in some conditions, and they don't shine as brightly as the larger .029" and .040" pins. Large .040" pins offer a brighter and more distinct aiming point, but they cover more of the target in the sight picture - which is especially noticeable when taking shots at longer distances, a trade-off to consider.

Bubble Levels

Many of today's mid to high grade sights now feature an integrated bubble level. This feature helps you keep your bow perfectly upright when shooting.

Unlike Longbow and traditional shooters, who will often deliberately shoot with a tilted bow, compound shooters typically want their bows to be perfectly upright when fired. If you are tilting your bow to the right, your shots will land a little right. If you are tilting your bow to the left, your shots will land slightly left. In short, tilting the bow degrades your horizontal accuracy. And MANY shooters tilt their bows without ever realizing it.

So the bubble level helps to add an element of consistency into your shooting routine. The only downside is that aligning the bubble level adds an extra step to your aiming process. But with practice, using the bubble level eventually becomes second-nature. And you'll be happy to know that they don't freeze in cold weather....they're usually filled with alcohol or chloroform.



Note: Only archers that shoot in the "Freestyle" divisions may have a bubble level incorporated in the sight or on the bow when shooting in an IFAA sanctioned tournament.

In the Barebow division a bubble level is allowed as long as it is below the arrow rest and cannot be used as a reference point for aiming.

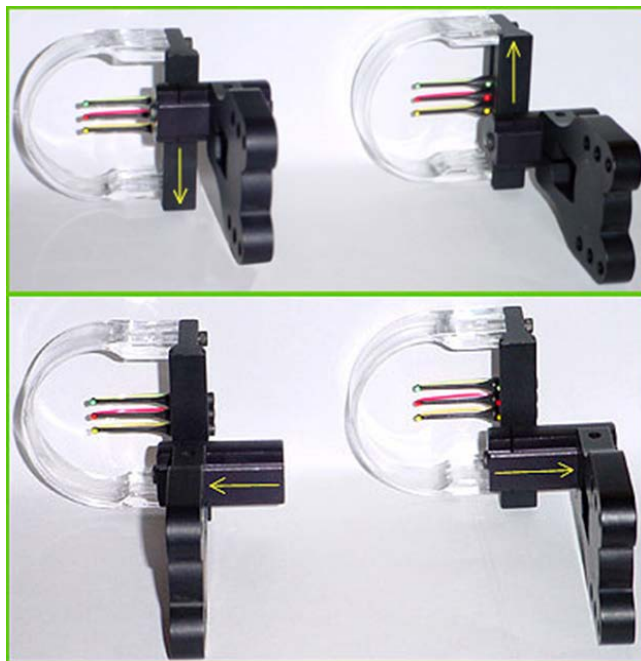
Bubble Levels for Left-Handers:

Some sights are not made as RH or LH specific models. Some sights are intended to be universal for both RH and LH use. In this case, all sight functions generally remain the same regardless of whether the sight is mounted as a RH or a LH model. However, if this kind of

sight comes with a bubble level, the bubble level will appear at the top of the sight for left-hand users. But not to worry, a straight bubble level will perform just as well at the top of the sight aperture as it will at the bottom. But please note that a few bubble levels are cambered (curved) and cannot be used upside-down. If the sight you like does not come in a LH specific model, make sure it does not use a cambered level.

Gang Adjustments

A gang adjustment is a feature on a sight that allows you to move all the pins simultaneously. Gang adjustments can be for elevation (height) or for windage (right & left settings). The sight on the left features both gang-elevation and gang-windage adjustments - meaning that all the pins can be adjusted up or down or side to side together. By loosening only one screw and sliding the dovetail bar up or down in the groove, the entire sight housing and all the pins can be raised or lowered. Similarly, a separate fastener allows the entire sight housing and all the pins to be moved horizontally. Not only do these features make the initial setup and sighting-in easier, but these features give the sight greater range of possible settings.



We suggest you look for sights that incorporate these features. Sights without gang adjustments are generally more difficult to adjust and setup, as each pin has to be individually adjusted for both windage and elevation. Fortunately, the majority of today's machined sights feature the easy gang-adjustments.

Micro Adjust Windage & Elevation.



Generally, gang adjustments are made by loosening a screw and then sliding the sight housing to a new position. But some sights are designed with a micro-adjust feature which allows gang windage and elevation adjustments to be made by turning an adjustment knob (usually attached to a simple gear that drives the motion of the housing).

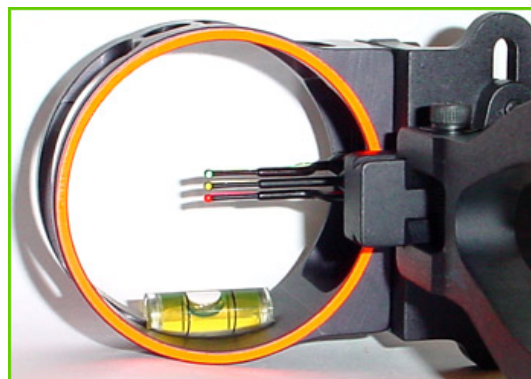
So instead of sliding the sight housing, you simply turn the knob or screw - and the sight housing slowly creeps to its new position. Micro Adjust sights are very precise and easy to work with, but they are typically quite expensive. If your budget permits, a micro adjust sight is certainly a nice piece of equipment. But this is a luxury feature that isn't really essential to a good hunting sight.

Zero Pin Gap (Near Zero That Is)

As compound bows have gotten faster and faster, the space between our pins (pin gaps) seems to get tighter and tighter. For example, a bow that's shooting 300+ fps may have 20 &

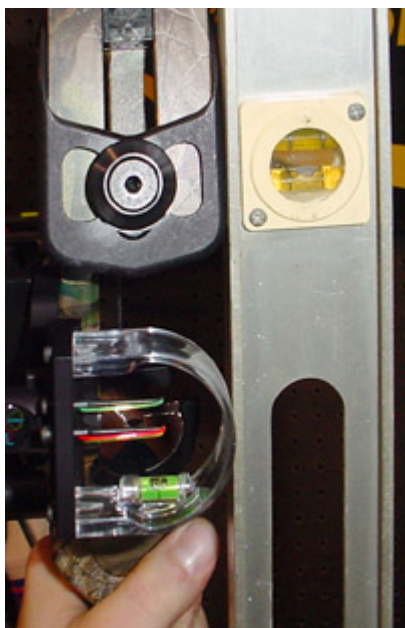
30 yard pins that are virtually right on top of one another. To accommodate faster bows, many manufacturers are designing sights so the pins can be spaced very close together. This is usually accomplished by using multiple pin-tracks and/or angled pins such that one pin can be literally set on the edge of another. Sights designed with this feature are said to have "zero pin gap" capability.

With a little marketing magic, "zero pin gap" has become a buzz-phrase in the industry. And as you might imagine, some sight manufacturers interpret the word "zero" a little differently than others. We find that better than half of the "zero pin gap" sights on the market can't actually be set for absolutely zero pin gap - but they get close. Even the 3-track sight pictured here cannot be set so that all three pins are actually touching. But it's so close - we'll spot them the ten-thousands of an inch.



The point is....if you shoot a zippy bow, you may need to consider a "zero pin gap" sight that will allow you to set your pins very close together. Especially if you plan to set your pins within a tight bowhunting range, say 10 -20 -30 yards, a zero pin gap sight will be a must. If your bow isn't such a speed demon, a standard single-track pin sight will work just fine.

2nd & 3rd Axis Adjustments.



Some sights feature 2nd and 3rd axis adjustments options. Admittedly, these features probably aren't necessary for a general purpose hunting rig. But for us hard-core enthusiasts and pathological tinkerers, these advanced adjustments are handy innovations. 2nd & 3rd Axis adjustments essentially ensure that your sight's bubble level is always telling you the truth.

The **2nd Axis** adjustment essentially deals with "levelling the level" on a sight. If a sight has a built-in level, and the sight is machined perfectly square, and the bow's riser is similarly perfectly square, the level should read a perfect zero-bubble when the bow is held upright at 0°. It's an easy thing to check if you have a carpenter's level. Just hold the carpenter's level along the side of the bow and stand it upright. If both the sight level and the carpenter's level come to zero-bubble at the same place, the sight's 2nd Axis is correct.

Naturally, you would think that all sights and bow risers are machined to be square. So you should be able to just bolt your sight in place and everything should line-up perfectly, right? Well...not necessarily. A sight's bubble level is usually installed in the outer pin guard, which is typically round or trapezoidal in shape. So getting the bubble level mounted in just the right place can be tricky business. It's not unusual to see a bubble level that's off a degree or two. And the fussy archer can spend many hours trying to shim and correct a 2nd Axis problem.

Fortunately, some sights come with an adjustment that allows you to "set" the level with just the turn of an allen wrench. A sight with 2nd Axis adjustments allows you to adjust the position of the entire sight housing - relative to the bow's riser, so that your sight's level correctly indicates when the bow is perfectly upright. This isn't a complex feature to

incorporate into a sight. Nonetheless, 2nd-Axis adjustments are typically available only on the more expensive sight models.

With all that said, obsessing over the issue of 2nd Axis is largely unnecessary. The whole point of using a bubble level is to keep you from canting (tilting/leaning) the bow when you shoot it. But most people can't hold their bows up perfectly upright at 0°, even with a bubble level. Everyone bobbles a little while aiming - so we're all bound to be off a degree or two from shot to shot. The bubble level just helps us to get it reasonably close. As such, fussing over a perfect 2nd Axis setting is probably inconsequential to overall accuracy for most bowhunters. But if you enjoy the technical hair-splitting, the 2nd Axis adjustment sight might be perfect for you!

The **3rd Axis** adjustment is a little different. A sight with 3rd-Axis adjustments can be adjusted so that the entire sight housing can swivel inward (to a position less than square) or outward (to a position beyond square). At first glance it would seem that setting the sight for a perfect 90° would be best (centre sight in photo).



But that isn't always the case. Most shooters hold their bow with some degree of hand-torque (slightly twisting the bow's riser to the left or right). The 3rd Axis adjustment helps to compensate for that. And since everyone shoots a little differently, a proper 3rd Axis setting is actually unique for each individual shooter. For some, dead square is still correct. For others, it's not.

Getting your 3rd Axis right essentially means getting the plane of the sight to be perpendicular to the path of your arrow. But due to individual shooting form variations, 3rd Axis levelling cannot be done on a vice or jig. It must be done at full draw. It's also worth noting that some bow risers can flex considerably at full draw - also degrading 3rd Axis alignment. So again, a 3rd Axis adjustment is best made with the bow at full draw. If you select a sight with 3rd Axis adjustments, contact the manufacturer for the specific setup procedure for your 3rd Axis settings.

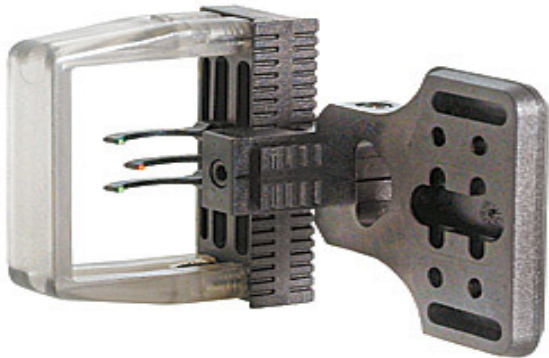
So why does a 3rd Axis adjustment matter? On level ground, it really doesn't. But an improperly set 3rd Axis can cause your level to give an inaccurate reading when shooting uphill or downhill. This can result in you executing your shot with a significantly canted bow - and missing your mark to the left or right. Again, this is an advanced feature for which the benefits may not justify the added expense and setup time. But if you're serious about getting most from a bubble-level sight, 3rd Axis adjustment might be an important feature to consider when choosing a new sight.

Machined Aluminum or Plastic?

Most of today's quality hunting sights are made from machined aluminium (aluminium alloys actually). Aluminium is an ideal material for this application, as it is lightweight, it doesn't rust, and it is readily available. With thoughtful engineering and the aid of CNC (Computer Numeric Control) machining technology, sight manufacturers can create very precise and intricate aluminium sight designs. Of course, CNC machining isn't exactly cheap. You can expect to pay quite a bit more for a sight that has all machined aluminium parts.

That's why it is common to see sights that have *some* machined parts and some plastic parts. Many of today's popular sights feature a machined aluminium mounting bracket and frame, with a plastic pin guard. And this isn't to suggest that plastic is bad. Some plastic parts are

actually quite durable. But good or bad, the buying public largely regards plastic products as **cheap or low-quality**.



As such, archery manufacturers deliberately avoid using the word "plastic" in their advertisements. Instead, they cleverly use code words like **composite**, **acrylic**, **poly**, and **lexan**. But in the end, they all mean the same thing....plastic. So if you wish to avoid plastic parts on your new sight, watch for the code words.

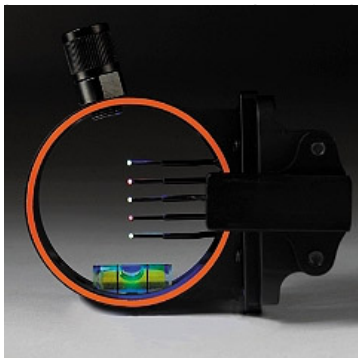
And while we're on the subject of clever codes, don't get too excited by ads that brag about using **Aircraft Grade 6061-T6 Aluminium**. It's nothing special.

6061 is the most common and least expensive of the heat treatable aluminium alloys. There are literally thousands of products that incorporate 6061-T6.

With all that said, we recommend you choose a good-quality machined sight with a minimum of plastic components. In the long run, it will be well worth the extra money spent.

Sight Lights & Radioactive Pins.

Some sights are designed to use a secondary light source to illuminate the pins - either via light sticks. Some sights come with this feature already incorporated and some manufacturers offer a sight light as an added accessory.



Optional sight lights frequently mount into a pre-drilled opening (like in the photo at left) in the sight's outer housing. But it's done a variety of ways - from one brand to the next. The sight light either shines directly on the sight pins, or on the fibre-optic elements of the pins, causing the pins to be visible even in total darkness. Of course, with this type of light, the user must turn the light on and off as needed - as they are typically powered by a small watch battery.

A few manufacturers take a more unique approach, infusing their sight pins with small amounts of radioactive tritium or phosphorescent powder. Tritium pins glow softly for up to 10 years without the need for batteries. Phosphorescent pins aren't radioactive, but work much like a "glow-in-the-dark" novelty item. The pins absorb ambient light and then slowly reemit the light after the light source is removed. So theoretically, a phosphorescent pin will remain visible for a brief period of time after dark.

All of these devices may indeed extend your shooting hours and pin visibility during dawn and dusk conditions. But a lighted pin is not a "night vision" system; it will not increase your visibility through the peep sight or illuminate your target. So even though you may be able to see your pins, you still may not be able to hit the spot.
