BILL'S HOME TECH

Home & Small Business Tech Solutions

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What Those Solar Panel Specs Actually Mean (Watts, Efficiency, Warranty)

The handful of numbers that matter on a solar quote — and the many you can ignore

Plain-English tech help from:
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Portage County, Ohio

Tech Made Simple. Service Made Personal.

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SUMMARY

The 60-Second Version

A solar spec sheet has dozens of numbers, but only a few matter to you. Wattage is power at full strength in a lab — weigh it lightly, since a bigger number is often just a bigger panel; what counts is the total system size in kilowatts. Efficiency (most good panels are around 20-23%, premium ones 24-25%) matters most when your roof space is tight.

Check both warranties — product covers defects, performance promises output years later — and 25 years on each is a strong sign. The quiet, useful number is the temperature coefficient: closer to zero means it holds more power in summer heat. Everything else on the sheet is mostly for your installer.

- Only wattage, efficiency, the two warranties, and the heat number matter to a homeowner.
- If a pitch leans on one giant figure with no brand or warranty beside it, slow down.
- A neutral read-through of your quote is exactly what I can do, with no panel to sell.

1 The Short Version

A solar salesperson has handed you a sheet full of numbers, or a neighbor is quoting watts and efficiency at you, and none of it means much yet. That is completely normal. A solar panel's spec sheet is written for installers and engineers, not for the person whose roof it goes on, so the important numbers hide among a dozen that barely matter to you.

This guide takes the handful of specs that actually affect your decision and explains each one in plain words, so you can read a quote, compare two panels fairly, and spot when a number is being used to dazzle you rather than inform you. You do not need any math or any technical background to follow along.

- Only a few specs matter to a homeowner: wattage, efficiency, the two warranties, and the temperature number.

- A bigger wattage is not automatically better; it often just means a bigger panel.
- Efficiency matters most when your roof space is tight, less when you have plenty of room.
- The warranties tell you more about long-term value than any single performance number.

> **WATCH OUT**
> You do not have to understand every line on a spec sheet. If you can read the wattage, the efficiency, and the two warranty lengths, you can hold your own in any solar conversation. The rest is detail an installer handles.

2 Why Spec Sheets Feel So Overwhelming

A spec sheet packs twenty or thirty figures onto one page, and almost all of them are there for a technical reason that never touches your life. There are testing conditions, electrical tolerances, certifications, and mechanical load ratings, each with its own abbreviation. It reads like a foreign language because, in a sense, it is one.

None of this is a trick aimed at you, and feeling lost is not a sign you are behind. The sheet was simply never written for a homeowner. Once you know which four or five numbers to look at and which to ignore, the page shrinks to something you can read in a minute.

> **GOOD TO KNOW**
> Two panels can look wildly different on paper and still be a near tie for your home. The differences that fill a spec sheet often matter only to the installer designing the system, not to the roof it ends up on.

3 Watts: The Headline Number

Wattage is the number everyone leads with: you will hear "these are 440-watt panels" or "these are 450s." A watt is simply a measure of power, and the panel's wattage is how much power it can produce at full strength under ideal test conditions. A higher number means that single panel can make more power when the sun is strong.

Here is the catch most people miss: a higher-wattage panel is very often just a physically bigger panel, or one with slightly newer cells. Two panels rated the same wattage can perform almost identically. What really matters for your home is the total of all the panels together, not the badge on any one of them.

- Wattage is power at full strength in a lab, not what you will see on a cloudy Tuesday.
- A 450-watt panel is not meaningfully better than a 440 for most homes; the gap is tiny.
- The number that matters is system size: all your panels added together, measured in kilowatts.
- One kilowatt is 1,000 watts, so roughly twenty-two to twenty-five modern panels make a 10-kilowatt system.

WATCH OUT

Be wary of a pitch that leans hard on "the highest wattage panel on the market." A bigger single number sounds impressive, but it may simply be a larger, heavier panel, and it tells you nothing about price, reliability, or whether it fits your roof well.

4 Efficiency: How Much Roof It Takes

Efficiency is the percentage of the sunlight hitting a panel that the panel turns into electricity. Most good residential panels today land somewhere around twenty to twenty-three percent, with premium models pushing toward twenty-four or twenty-five. That may sound low, but it is a normal, healthy range, and the leftover sunlight simply becomes a little heat.

The practical meaning is about space, not magic. A more efficient panel makes more power per square foot, so it matters most when your usable roof is small and you want to fit as much power as possible into a tight area. If you have a large, open roof, a slightly lower-efficiency panel can give you the same total power for less money, just using a little more room.

> **GOOD TO KNOW**
>
> Efficiency is often where a salesperson tries to justify a much higher price. A jump from twenty-one to twenty-three percent is real, but on a roomy roof it may buy you almost nothing you will notice on your electric bill. Ask what it actually adds for your specific roof.

5 The Two Warranties — and Why They Differ

Every panel comes with two separate warranties, and they protect against two different things. The first is the product warranty, which covers the panel itself against defects in how it was made. The second is the performance warranty, which promises the panel will still make a certain percentage of its original power years down the road.

These are not the same, and a long one does not imply a long other. In the past, product warranties were often only ten or twelve years while the performance promise ran twenty-five. On today's better panels, both are frequently twenty-five years or more, which is a genuine sign of a confident manufacturer.

Warranty	What it promises	Good today
Product	The panel is free of manufacturing defects	25 years on better panels
Performance	It still makes X% of rated power after Y years	~87-92% at year 25-30

TIP

When two panels are close on everything else, the warranties are the tie-breaker. A panel with a 25-year product warranty is telling you the maker expects it to last; a 12-year product warranty quietly tells you the opposite.

6 The Temperature Number Nobody Explains

Tucked on the sheet is a "temperature coefficient," usually a small negative number like minus 0.29 percent per degree. It sounds hopelessly technical, but the idea is simple: solar panels lose a little power as they get hot, and this number says how much. A smaller number (closer to zero) means the panel handles heat better.

This matters more than people expect, because panels on a sunny roof run far hotter than the air around them. On a scorching July afternoon a panel can be well over a hundred degrees. A panel with a better temperature number holds onto more of its output in that heat, which adds up over many summers.

GOOD TO KNOW

This is one spec where a better number quietly pays you back every hot day, yet it almost never comes up in a sales pitch. If a salesperson is comparing two panels, it is a fair and smart question to ask which one holds up better in the heat.

Rather not do this yourself? I'll come to your home and set it up for you — a flat $99 first visit across Portage County, Ohio and nearby communities. Outside the area? I also help remotely by phone or screen-share. Book at billshometech.com/book or call (330) 200-8042.

7 Specs You Can Safely Ignore

Plenty of lines on the sheet are real and correct but simply not your concern. They exist so the installer can design a safe, code-compliant system. Knowing you can skip them is as useful as knowing which ones to read.

- Open-circuit voltage and short-circuit current: electrical design numbers for the installer.
- Maximum system voltage: a wiring limit the installer must respect, not a quality mark.
- Mechanical load ratings: how much snow and wind the panel is tested to take, which your installer checks.
- Cell count and busbars: how the panel is built inside; interesting, but not a buying factor.
- Certifications like UL and IEC: good to see present, but nearly all reputable panels have them.

TIP

If a salesperson spends a long time on these deeper numbers, it is fair to gently steer back: "How does this change my power, my price, or my warranty?" If the honest answer is "it doesn't, really," you have learned something useful.

8 Reading a Real Quote Line by Line

When a quote lands in your lap, you can check it against a short mental list. You are not grading the engineering; you are making sure the basics are present, sensible, and comparable to any other quote you get.

1. Find the panel brand and model, and the wattage of each panel.
2. Find how many panels and the total system size in kilowatts (watts times number of panels, divided by 1,000).
3. Find the panel's efficiency percentage and note whether your roof space is tight or roomy.
4. Find both warranty lengths — product and performance — and write them down.
5. Note the brand so you can look up whether it is financially stable (covered in the brands guide).

> **WATCH OUT**
>
> A quote that hides the panel brand and model, or lists only a wattage with no maker, is a red flag. You cannot compare two systems fairly if one will not tell you what is going on the roof. Ask plainly, and be cautious if the answer stays vague.

9 Comparing Two Panels Fairly

The honest way to compare two panels is to line up the same handful of numbers side by side and resist being pulled toward whichever has the single flashiest figure. Most of the time, two reputable modern panels are far closer than either salesperson will admit.

Look at	Panel A	Panel B
Wattage	Note it, but weigh lightly	Note it, but weigh lightly
Efficiency	Matters if roof is tight	Matters if roof is tight
Product warranty	Longer is better	Longer is better
Performance warranty	Longer is better	Longer is better
Heat (temp coefficient)	Closer to zero is better	Closer to zero is better

> *Two good modern panels are usually a near tie. The bigger differences in a solar quote are almost always the installer, the price, and the warranty support — not the panel badge.*

10 Where Numbers Get Used to Dazzle

Because so few homeowners can read a spec sheet, a number is sometimes waved around to impress rather than inform. This is not always dishonest, but it is worth recognizing so a big figure does not push you into a decision.

- "Highest wattage available" — often just a bigger panel, not a better value.
- "Record-breaking efficiency" — may add little on a roomy roof, and costs more.
- "Military-grade" or "aerospace" language — marketing words with no fixed meaning.
- A single giant number with no warranty or brand beside it — the context that matters is missing.

WATCH OUT

There is no shame in saying, "I'd like to have someone neutral look this over before I sign." A reputable installer will not mind. The ones who pressure you to decide today are the ones worth a second opinion — exactly the kind of read-through I do for folks around the county.

11 Those Testing Conditions (STC and NOCT)

Every wattage and efficiency figure on a spec sheet is measured under laboratory conditions, and the sheet names them with two abbreviations. STC means Standard Test Conditions — a cool panel, bright full sun, no wind, all perfect. NOCT, sometimes called NMOT, is a more realistic warm-panel condition. You do not need the details, but you do need the point they make.

The point is this: the headline wattage is the STC number, measured under ideal lab conditions your roof almost never sees. A panel labeled 440 watts will usually produce somewhat less than that in real life, because real sun is not a perfect lab. This is normal and expected, and it is the same for every brand, so it does not change a comparison between panels.

Condition	What it assumes	What it tells you
STC	Cool panel, perfect bright sun	The headline wattage — a best case
NOCT / NMOT	A warm panel in realistic sun	A number closer to real output

> **GOOD TO KNOW**
> If you ever wonder why your system does not hit its full rated number on a hot sunny day, this is why: the rating is a cool-lab best case. It is not a defect and not false advertising — every panel on the market is rated the same way.

12 Why Specs and Real Output Differ

It helps to set your expectations honestly. The specs describe the panel in a lab; your home adds a dozen real-world factors that trim the number down a little. None of this means a panel is underperforming — it is just the gap between a test bench and a rooftop.

- Heat: panels run hotter than the air and lose a little power when hot (the temperature number).
- Angle and direction: a roof that does not face due south at a perfect tilt gives up a little.
- Dust, pollen, and the occasional leaf: a thin film of grime shaves a small amount.
- Wiring and the inverter: a little energy is always lost turning panel power into house power.

- Weather and season: short winter days and cloud cover lower the total, as they would for anyone.

> **GOOD TO KNOW**
> A good installer quotes you an expected yearly production that already accounts for all of this, not the raw panel wattage. If someone promises output suspiciously close to the perfect lab number, ask how they got there.

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13 How Specs Connect to Degradation

One more spec ties the whole sheet together over time: degradation, the slow yearly loss of output every panel experiences. It links directly to the performance warranty. A panel might lose a small fraction of its power each year, and the warranty promises it will still make a stated percentage after twenty-five or thirty years.

On today's better panels this yearly loss is very small — roughly half a percent a year or less — so a panel often still makes close to ninety percent of its original power decades later. A lower degradation number and a stronger performance warranty tend to go together, and both are signs of a confident, quality panel.

> **GOOD TO KNOW**
> We have a whole separate guide on degradation, so you do not need to master it here. Just know that the performance warranty and the degradation figure are two views of the same promise: how well the panel holds its power as the years pass.

14 A Plain-English Glossary to Keep

Keep this short list by your quotes. These are the only terms you really need to hold the thread of a solar conversation.

- Watt: a unit of power. Panel wattage is its output at full strength in a lab.
- Kilowatt: 1,000 watts. System size is measured here; all panels added up.
- Efficiency: the percent of sunlight turned into electricity; higher saves roof space.
- Product warranty: covers defects in the panel itself.
- Performance warranty: promises a minimum output years later.
- Temperature coefficient: how much power is lost as the panel heats up; closer to zero is better.
- STC: the ideal lab conditions behind the headline wattage.
- Degradation: the small yearly loss of output over the panel's life.

> **TIP**
>
> You can read this list aloud to a salesperson and ask them to point to each one on your quote. If any are missing, that tells you something about how complete the quote really is.

15 A Worked Example: Reading One Quote Start to Finish

The best way to get comfortable is to walk through a quote the way you would at your own kitchen table. The numbers below are a made-up but realistic example, not a real product — the point is the method, which works on any quote you are handed.

Say the quote names a panel we will call the "Sunfield SF-430," rated at 430 watts, and proposes twenty-two of them for your roof. The efficiency line reads 21.3 percent. The warranty lines say twenty-five years product and ninety-two percent of rated power at year thirty. Down in the fine print, the temperature coefficient is minus 0.29 percent per degree. Here is how to read that in under two minutes.

Line on the quote	What it says	What you do with it
Panel model	Sunfield SF-430	Write it down so you can compare and look up the maker
Wattage each	430 W	Note it, but do not be wowed; it is one panel's lab rating
Number of panels	22	You need this to find the real system size
Efficiency	21.3%	A healthy mainstream number; matters if your roof is tight
Product warranty	25 years	Strong — the maker expects it to last
Performance warranty	92% at year 30	Strong — little fade promised over three decades
Temperature coefficient	-0.29%/°C	A good heat number; closer to zero is better

1. Multiply the wattage by the number of panels: 430 times 22 is 9,460 watts.
2. Divide by 1,000 to get the system size in kilowatts: 9,460 ÷ 1,000 is about 9.5 kilowatts. That one number — not the 430 — is the honest size of your system.
3. Look at the efficiency (21.3%) and ask yourself only one thing: is my usable roof tight or roomy? If roomy, a slightly lower number would cost less and do the same job.
4. Read both warranty lengths together. Twenty-five years product and ninety-two percent at year thirty is a confident, quality pair.
5. Glance at the heat number (-0.29%/°C). A good panel sits roughly between minus 0.26 and minus 0.34 per degree, so this one is right where you want it.

GOOD TO KNOW

Notice what you did not need: voltage, current, cell count, load ratings, none of it. Five lines — model, wattage, count, efficiency, and the two warranties — told you nearly everything that affects your home. That is the whole skill.

16 Two Quotes, Side by Side — With Real Numbers

The real test comes when two companies hand you two different panels and each says theirs is better. The honest move is to line the same few numbers up in two columns and read them calmly. Below are two example panels with the kind of figures you will actually see.

Look at	Panel A	Panel B
Wattage each	430 W	445 W
Efficiency	21.3%	22.6%
Product warranty	25 years	25 years
Performance warranty	92% at year 30	90% at year 25
Heat (temp coefficient)	-0.29%/°C	-0.34%/°C
Price	Lower	Higher

At a glance, Panel B looks like the winner: more watts, higher efficiency, a bigger headline everywhere. But read it the way you now know how. The extra fifteen watts mostly means a slightly larger panel. The efficiency edge only buys you something if your roof is tight. And look lower down: Panel A actually holds its power a touch better in the heat, and its performance warranty runs longer, to year thirty instead of twenty-five.

- Panel B's advantages (watts, efficiency) are the flashy numbers a pitch leads with.

- Panel A's advantages (longer performance warranty, better heat number) are the quiet ones that pay you back for years.
- Unless your roof is genuinely tight on space, these two panels will produce a very similar amount of power for your home.
- So the real decision comes down to price, the installer's reputation, and warranty support — not the panel badge.

> *The flashiest number is rarely the one that matters. When two good panels are this close, the better choice is usually the lower price from the installer you trust.*

17 Questions Worth Asking Before You Sign

You do not need to sound like an engineer to ask good questions. A few plain ones, asked calmly, tell you more about a quote — and about the person selling it — than any spec line. Here are the ones worth asking, with the honest answers behind them.

Do more watts mean a lower electric bill?

Not by themselves. Your bill depends on how much power the whole system makes over a year and how much electricity you use, not on the number stamped on a single panel. A higher-wattage panel often just means you need a few fewer of them, not that you save more money.

Is higher efficiency worth paying extra for?

Only if your usable roof is small. Efficiency buys more power per square foot, which is precious on a tight roof and nearly pointless on a big open one. Ask the salesperson plainly: on my roof, how many more kilowatts does the pricier panel actually add? If the answer is "not many," you have your answer.

Isn't there a 30 percent federal tax credit that pays for a lot of this?

That large federal residential solar tax credit ended on December 31, 2025, so it is no longer something a new quote can count on. If a salesperson's savings math still leans

on that 30 percent, the quote is out of date — ask them to show you the price and payback without it. Installed solar commonly runs somewhere around three dollars per watt before any incentives, so for our example 9.5-kilowatt system that is a serious purchase to weigh on its own merits.

There may be smaller state or utility programs from time to time; ask, but get any claim in writing.

If I only check one thing, what should it be?

The two warranties. They quietly tell you how long the maker expects the panel to last and keep performing, and they are the fairest tie-breaker when everything else looks close.

- "What is the total system size in kilowatts, and what yearly production do you expect on my roof?"
- "What are both warranty lengths — product and performance — on this exact panel?"
- "Is your savings estimate based on any tax credit, and does it still hold without one?"
- "Can I have a day to think it over?" — and notice how they react.

> **WATCH OUT**
>
> If a salesperson pressures you to sign today, or gets vague when you ask for warranty lengths and a size in kilowatts, that is your cue to slow down. A neutral read-through of the quote — which I am glad to do, with no panel to sell you — costs you nothing and often saves a great deal.

18 When to Call Bill

Reading a spec sheet is a skill, not a talent, and most people get comfortable with it after one good walk-through. But you do not have to do it alone, and there is real value in having someone with no panel to sell sit beside you and read the quote plainly.

I am an independent local tech — I do not sell or install solar, and I have no stake in which company you choose. What I can do is sit at your kitchen table, go through a quote or two line by line, translate the numbers into what they mean for your home, and flag anything that looks off. I have spent 30-plus years helping people in Portage County understand the technology in front of them, and a solar quote is exactly that kind of thing.

- You have a quote and want it translated into plain English before you decide.
- Two companies gave you very different numbers and you cannot tell why.
- A salesperson is leaning on one big figure and you want a neutral read.
- You simply want someone in your corner who is not trying to sell you panels.

CHEAT SHEET

Everyday Cheat Sheet

Keep this with your solar quotes. These are the only numbers you really need to read.

I want to...	Do this...
Read the headline number	Wattage = power at full strength; weigh it lightly, a bigger number is often just a bigger panel
Judge roof fit	Efficiency (~20-23%, premium ~24-25%); matters most when roof space is tight
Judge long-term value	Check BOTH warranties: product (defects) and performance (output later); 25 years each is strong
Judge hot-weather output	Temperature coefficient closer to zero holds more power in summer heat
Compare two panels	Line up wattage, efficiency, both warranties, heat number side by side
Spot a dazzle pitch	One giant number with no brand or warranty beside it = context missing
Get help	Call Bill: (330) 200-8042

BEFORE YOU GO

A Note From Bill

A quick note from Bill. I write these guides to make home tech a little less frustrating, and I do my best to keep every step accurate and up to date. Still, every home, device, and setup is a bit different, so I can't promise a guide will match yours exactly or fix your particular problem. These guides are for general information only — they're not professional, legal, or financial advice, and they don't replace your device's own manual or the manufacturer's instructions. Please go slow, use your own good judgment, and use everything here at your own risk. If a step involves electrical wiring, a gas appliance, a water heater, plumbing, or climbing a ladder — or if anything just doesn't feel safe — please stop and call a licensed professional (or give me a call at 330-200-8042). Bill's Home Tech and Bill Davis can't be responsible for any damage, data loss, or injury that results.

HOW I CAN HELP

Your Visit — and My Promise

You don't have to remember all of it — just that a friendly, patient person is one call away, whenever you'd rather have a hand.

KEY SPECS

In your home — $99 flat for the first visit, no contracts and no surprises, with a 30-day come-back-free follow-up. In-home visits cover Portage County, Ohio and nearby communities.
Outside the area? Remotely — $49 for a screen-share session (free for Support Plan members, $39/mo), refundable if I can't fix it — and credited toward a visit if you'd rather have me in person. Book either at billshometech.com/book.

GOOD TO KNOW

My promise — If you're not 100% satisfied with your visit, I'll come back at no charge, or refund the full $99. No questions, no awkwardness. That's how I'd want to be treated.

Whenever you're ready, I'll come to your home anywhere in Portage County, Ohio and nearby communities, at your pace. Too far for a house call? I also help remotely. Book at billshometech.com/book or call (330) 200-8042. — Bill

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