CRACKING THE QUALITY CODE

Over the course of my 30-plus years in the home performance industry, I've found that most contractors have only the slightest notion of what constitutes quality work. I reached this conclusion while talking to thousands of contractors across the country.

qual·i·ty *noun*
/kwäledē/

Quality is meeting agreed-upon requirements and standards for every part of every job

I started handing out 3 × 5 index cards asking contractors to write down their definitions of quality. If there were 50 people in the audience, I would usually get back 50 different definitions. In many cases, it was the first time any of them had stopped to think about the subject. Although most of these people want to do good work, their lack of clarity concerning good processes makes it hard for them to deliver— and it's costing them a lot of money!

My aim in this article is to provide a clear definition of quality and to provide guidance on how to achieve it. I will also demonstrate why dedication to quality not only pays for itself but also adds to the bottom line.

What Is Quality?

The definitions I've seen on those 3 × 5 cards include phrases such as "goodness," "better products" and "work that satisfies the customers"—little more than well-intentioned sentiments. Such sentiments have two major shortcomings: They're open to interpretation, and they're not measurable.

Real quality work starts with a definition that's clear and measurable. Here's the one I use: Quality is meeting agreed-upon requirements and standards for every part of every job. It is important to understand that agreed-upon requirements and standards must leave nothing to the imagination. They cannot be open to interpretation, and they cannot be based on feelings or wishful thinking.

As an example, if I agree to make the room above a garage more comfortable, that promise is open to interpretation. The homeowner and I may have different interpretations of what feels comfortable, which could cause conflicts or callbacks. A clear and measurable goal would be to agree to insulate and air seal the room and install new windows, which would result in a temperature in the room that would not deviate more than 5˚F from the thermostat set point. If we met the goal after the work is complete, yet the homeowner decides that a 5˚F variation isn't comfortable enough, we can adjust and set a new goal. However, the original goal was clear and no one can argue that we failed to meet the original goal.

Quality Control Vs. Quality Assurance

In the above example, there was a process (measuring the temperature in the room) in place to determine whether the contractor met the agreed-upon goal. The act of measuring, actually monitoring the work to ensure that the contractor's work performs as intended, is what is meant by quality assurance (QA).

If the contractor is working for a utility or government program, then the program usually performs the QA. However, if the program isn't consistent with the QA process, or if the contractor is working for private clients, it's in the contractor's interest to have an in-house QA program.

In addition, contractors need to have a set of processes in place to avoid deviating from the requirements and standards to meet the agreed-upon goal. This is what is meant by quality control (QC). Unlike quality assurance, quality control is always the contractor's responsibility.

Remember, our definition of quality is meeting agreed-upon requirements and standards on every job. Our standard of quality is zero defects, not 1% or 2% defects, but zero. Either you meet the standard or you don't. In short, we must refuse to tolerate defects. Our culture must be one of prevention. When we make a mistake

that causes a defect, we set in motion a process that will prevent the mistake from happening again. The sad truth is that most contractors still lack the processes to make sure the work gets done right consistently, or to confirm that it has been done right in the first place.

One of the services offered by Advanced Energy is helping contractors implement quality programs. We start by looking at their current work processes. In doing so, we have found that defective work is costing most of them 25–40% of their operating budget. For example, even a small problem like forgetting to weather-strip the attic hatch can be expensive once you add up the time it takes for a worker to go back and fix it. Avoiding those problems will cover the cost of good in-house QC and QA programs.

A good measurement of quality is the cumulative cost of such problems. Although perfect conformance to standards is the goal, no one is perfect. However, if the cost of poor quality reaches 3–5% of the company's operating budget, it's time to take a hard look at that work. In fact, a few common but costly errors can take a company to that 3–5% threshold quite rapidly. For instance, an insulation project requires blowing insulation into every bay in the exterior walls of a home, but the crew misses one bay. If that uninsulated bay shows up on an infrared (IR) camera scan, it will be flagged for repair work. Returning to that job to install the missing insulation can become very expensive.

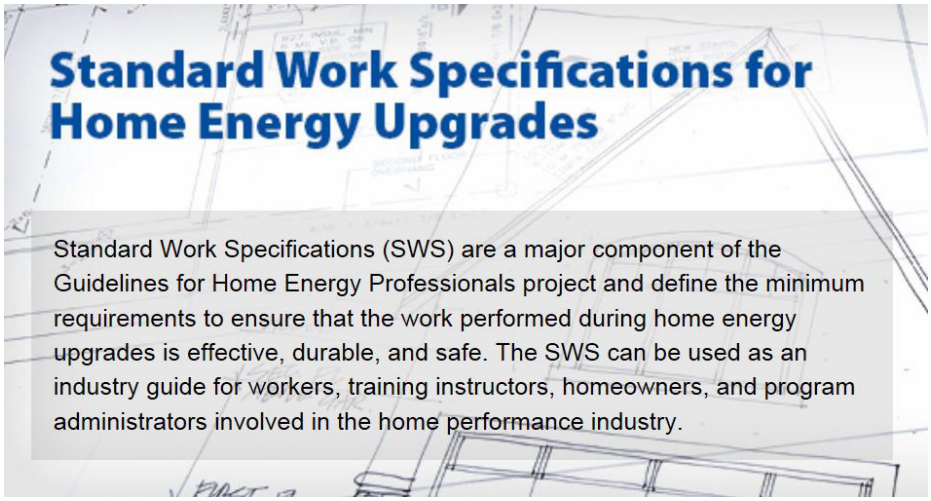
Setting Standards

In order to ensure that work gets completed with the highest level of quality, written standards need to be applied to each task. Although contractors can write their own standards, there's a plug-and-play solution. Advanced Energy, along with the Department of Energy and the National Renewable Energy Lab, has helped develop a set of standardized work specifications (SWS) for residential energy retrofits.

The SWS for single-family, multifamily and manufactured homes provide very detailed guidelines for home energy upgrades. The SWS define the minimum requirements for every task that a residential contractor is likely to perform, and using these specs will help ensure that the tasks get done right every time.

The SWS are specific enough that crew leaders and inspectors can ensure that work gets done correctly, but broad enough that contractors have choices in the materials to use and how to complete the work. For instance, one standard requires that chases be capped with a material that doesn't bend, sag or move when installed, but doesn't specify the material. The contractor can use plywood, drywall, OSB or any other material that meets the requirement.

Whether you use the SWS standards or write your own, an effective standard must address a specific need, define the necessary tasks, and outline a measurable performance outcome. Examples include: the requirement that insulation be in contact with the air barrier, that a vapor retarder cover 100% of a crawl space floor, or that a bath fan exhaust a minimum of 50 CFM to the outside.



Advanced Energy actually has a standard for quality standards, what we refer to as “S.A.F.E.” This acronym stands for: Specific, Assessable, Feasible and Effective.

Specific: The outcome in a standard must be specific and measurable. For example, requiring “substantially airtight” ducts is too vague. Requiring they “not leak more than 99 CFM25” is specific and measurable.

Assessable: The outcome has to be verifiable using industry standard equipment. For example, verification equipment can include IR cameras, blower doors and duct blasters.

Feasible: The outcome must be something that properly trained workers can achieve with standard materials. If a particular material, tool or trade is essential, the standard must include it. For example, using caulk that meets the requirements of ASTM C834-10.

Effective: All solutions must be capable of producing an intended result. For example, the way to ensure an attic is properly air sealed, is to require the air sealing be done before blowing the insulation.

Making It Work

We have found that the SWS—or any quality program—will only get implemented when the contractor provides employees with written instructions. These instructions need to include: (1) notes to use when training employees on the SWS, and (2) pictorial guides covering critical details that are stored in a binder or on an electronic device for use in the field.

✓	N/A	PREP	
☐	☐	1.	Complete a combustion safety test and record the results.
☐	☐	2.	Verify that a ventilation plan is established.
☐	☐	3.	Put on all personal protection equipment (PPE).
☐	☐	4.	Identify all worker and occupant safety hazards.
☐	☐	5.	Identify all potential durability issues.
☐	☐	6.	Address all combustion safety, worker safety, occupant safety and durability issues prior to starting work and notify the occupant. Do not complete work if a life safety hazard is identified.
☐	☐	7.	Create a diagram of the attic, walls and/or floor, identifying area needing sealing.
✓	N/A	AIR SEALING	
☐	☐	8.	Remove existing insulation at air sealing locations.
☐	☐	9.	For homes with vented exterior soffits, install protective baffling.
☐	☐	10.	Install insulation dams.
☐	☐	11.	Verify that all wall cavities have six sides. Install additional blocking where necessary.
☐	☐	12.	Install infill material in all extra large holes.
☐	☐	13.	Seal all small, medium and large holes between the unconditioned and conditioned space.
☐	☐	14.	Reinstall removed insulation and install new insulation to align with the air barrier and according to the manufacturer's specifications. Verify that all insulation has no gaps, voids, compression or misalignment.

JOB INFORMATION	
Installer Name	Initials
Address	Date

We also suggest using mistake-proofing verification forms that guide the crew chief or project manager in performing quality checks in the field. This step ensures that the work was installed correctly and it minimizes the chance of a customer callback.

Having workers follow specifications requires more than just paperwork. It also requires a change in attitude—not in the workers, but in management. It’s common for managers to look for someone to blame when something goes wrong. But my experience working with contractors—along with several years researching quality efforts in other industries—has taught me that quality problems are usually the result of failed processes. If a duct wasn’t properly sealed, it’s probably not intentional on the part of the workers, because most people actually want to do good work. It’s likely that the company lacks good QC and QA processes to identify and fix the problem, and ensure that the job gets done right.

If we believe that process fails more than people, then when a problem arises, we will take a look at the process, and not look to blame the people. For example, if a worker caps a chase but leaves a 1-inch gap around the edge. Rather than blaming the worker, examine your processes to determine what made that error possible. You may find that your training process is inadequate. This type of blame-free workplace is a powerful motivator.

W. Edwards Deming, a founding father of the quality movement, outlined 14 practices he considered essential for companies wanting to increase the quality of their output. One of the most important was “drive out fear.” His point was that workers who fear their bosses will duck under the radar whenever there’s a problem, and will even lie to shield themselves from consequences. That kind of culture makes quality improvement impossible. If, on the other hand, workers know they won’t be blamed, they will be more willing to work with management to improve processes and to increase quality.

I know this dynamic works because we've used it with our team at Advanced Energy. We made a commitment that whenever problems arise, we'll get together to examine the process and work to correct it. Our productivity and the quality of our results have improved substantially, and the work environment has become more enjoyable.

Contractors can realize big dividends by setting clear standards, working with employees to make sure the company meets those standards, and having processes in place to check the quality of their work. The savings earned by implementing quality management plans and standard work processes more than pay for the effort required. After all, no one loses money doing work right the first time!

Air seal supply and return duct terminations to drywall and/or subfloor with caulk, foam or equivalent material. Use fire-rated sealants where applicable.