Out With the Old...

A Step-by-Step Tankless Water Heater Retrofit Project

By Jack Sweet

Tankless water heaters have been getting a lot of press over the past few years. They've been featured on television programs as part of house renovations and their benefits—like energy efficiency, longer equipment life, compact size and practically endless supplies of hot water—are attractive to homeowners all over the country.

More and more plumbing contractors are getting aboard the tankless water heater sales and installation bandwagon as demand among their customers grows. Lots of articles will go on about the benefits and energy savings, but it's not often you get a look at exactly what goes into the job of switching a house from a tanked to a tankless water heater.

We decided to rectify this situation, so we followed along with the technicians from Saddleback Plumbing in Rancho Santa Margarita, Calif., (Chris Chronister, Jimmy Dean, Dan Smith and Thomas Pangrazio) as they installed a new Bradford White Ever-Hot Residential Indoor Tankless Water Heater into a suburban Southern California home.

Of course, every tankless retrofit job will be different—it's just the nature of the beast. And there was more to this job than could be shown in only four pages of the magazine. This is a thumbnail view of the project. To see additional, even more detailed, photos of this project, visit our Web site, *www.reevesjournal.com*.

Considerations

The city in which this installation took place—Mission Viejo, Calif.—is a Uniform Plumbing Code city that requires a permit before changing water heaters, either tanked-to-tanked or tanked-to-tankless. Other areas may have the same or similar requirements, possibly even requiring a post-installation inspection like this one. The importance of having all these details worked out before starting a job can't be stressed enough.

Other things to think about include where the unit will be mounted, the size of the gas line coming into the house, the location of the meter, the amount of approved vent pipe that will be required, the pitch of the roof if your vent stack will go there and what other gas-fired appliances like clothes dryers, fireplaces, furnaces or stoves, are in the house. You and your customer may discover that it would be more cost-effective to install a replacement storage tank-type water heater rather than a tankless unit.

It's also critically important that the tankless heater be installed strictly according to the manufacturers' instructions. This will go a long way toward eliminating any problems—or answering any questions from inspectors—down the road.

As far as the gas line coming into this house was concerned, calculations based on the charts included in the extensively detailed installation instructions revealed that the existing ¾-inch piping would not be adequate to provide the minimum input BTU the new unit required, so a new, dedicated 1-inch gas line was required.

The first part of the job for Saddleback Plumbing was to run a new length of 1-inch TracPipe-brand corrugated stainless steel tubing from OmegaFlex, Inc., from the meter, into an exterior wall, across the attic and down to the water heater. The other gas-fired appliances, in this case the furnace, fireplace and clothes dryer, were slated to stay on the original 3/4-inch lines. The first step was locating and drilling a hole from the garage and into the attic. A 1-inch galvanized gas pipe was installed into this hole and braced to the garage rafters. The 1-inch CSST was connected to this line, braced up inside the attic and then down through an interior wall on the other side of the house for connection to the gas meter.

At the other side of the house, access had to be cut into the drywall inside a closet to access the exterior wall adjacent to the gas meter outside. (Note the original 3/4-inch gas line in the photo.) Another hole was drilled through the 2 x 4-inch firestop to accommodate the CSST.

Installing the new CSST line in the garage was a snap. First it was pushed down through the interior closet wall so it could be connected to the gas meter later. Then it was attached to the rafters in the attic, stretching across the house to the hard pipe previously installed through the garage wall. Once the line was complete it was time to begin installing the new water heater.

Here's a view of the gas connections as found. This house was constructed in 1965 and the ensuing 41 years have provided plenty of time for previous owners to add various, "custom improvements." This rig feeds the tanked water heater, top right, the clothes dryer, bottom right, and the house's furnace. All this junk needs to go.

The first job for Saddleback Plumbing tech Jimmy Dean was to was to shut off the gas and the water mains for the house. Then the old heater was drained, disconnected and unceremoniously carted away to water heater heaven.

This is a view of the old water heater's location. The gas line shown coming out of the top of the pedestal is connected to a run of 3/4-inch line underneath. The top had to be removed to get under there to install a new gas line for the furnace and re-route the water lines for the tankless heater.

Moving into the bedroom closet adjacent to the gas meter outside, the old, 3/4-inch gas line was cut and joined with a reducer to a T fitting and a 90-degree elbow to feed the new 1-inch CSST line through the attic. Note the metal bracing in the now-notched firestop. The 1-inch galvanized pipe at the bottom terminates at a 90-degree fitting to which will be attached a 1-inch nipple that will come in from the gas meter.

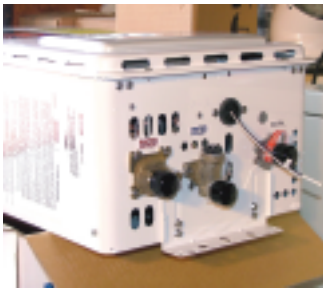
Out with the Old...

The old unit was a 40-gallon Reliance Gas 501—model 5-40-NORT971—that featured a 32,000 BTU/Hr. input and an energy factor (EF) of 57 percent. *[EF ratings are simply a ratio of energy output to energy consumed.—Ed.]* It had served well throughout its life, but it was a 1996 vintage model and the homeowner was looking to make a preemptive replacement/upgrade.

The replacement tankless heater is a Bradford White IGI-180R-10N natural gas unit with minimum/maximum BTU input of 15,000/180,000. The operating range is between 96- and 160 degrees Fahrenheit, and it's rated to deliver up to 8.5 gallons of hot water per minute. It posts an 87 EF rating.

Going Tankless

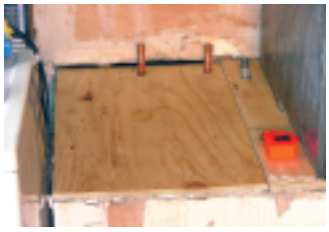
Outside, the house's gas meter was completely removed and fitted out with new 3/4-inch fittings before being reinstalled. It seems counter-intuitive to feed a 1-inch line with the 3/4-inch valve in the meter, but Dean said a 3/4-inch valve can feed up to 1 1/4-inch lines but you have to do it right off the meter. Meanwhile the existing hole in the exterior wall was enlarged to accommodate the new 1-inch nipple then sealed with patching material once everything was back in place.



Here's the bottom of the Bradford White tankless water heater showing the various connections. Units from other manufacturers are similar.

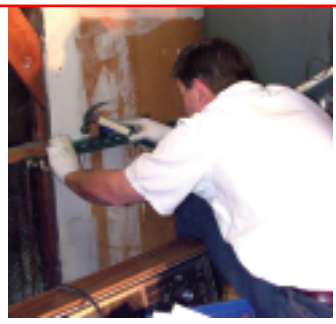
Once the cover was removed from the old water heater's pedestal, work could begin re-routing water and gas lines. The stub on the right in the photo will be the new feed for the furnace unit on the right.

Tom Pangrazio, left, and Dean installed the new vent stack on the roof. The old heater's vent was removed and the new flashing assembly was simply slid under the shingles and aligned with the existing hole in the roof. The vent was dropped into position in the adjustable flashing assembly and checked from the inside to make sure it was plumb before it was braced to a rafter with a supplied clamp. It was then sealed up with a nice slathering of roof mastic.



The old water lines feeding the tanked water heater came through the wall above the spot where the water fittings needed to go for the tankless unit. They were removed and new stubs were sweated into position. The new gas line for the furnace will exit there, too. It will run up to a 90-degree fitting where a nipple and shutoff will be installed. The final connection was made using a 3/4-inch flex connector.

On this installation, Saddleback Plumbing needed to use a pair of 45-degree bends and one whole section of 39-inch vent piping. Another section of 39-inch vent piping needed to be shortened with the Sawzall to make the connection fit. The only potential "gotcha" when cutting the vent pipe is to make sure both the inner exhaust and outer inlet pipes are thoroughly deburred



Unistrut metal framing material was cut to length in preparation for being lag-bolted to studs in the installation location. The water heater will then be bolted to the Unistrut using the unit's integral and adjustable mounting bracket and spring-loaded captive nuts. Saddleback used four 1 1/2-inch 3/8"-20 bolts to anchor the tankless unit to the Unistrut. It won't be coming down any time soon.

The next step was to install a pair of Webstone hot and cold isolator valves to the bottom of the tankless unit and then plumb the water heater up to its new water lines. An additional shutoff valve was added to the cold side as per the manufacturer's instructions specific to this unit. Once the new water lines were sweated into position and connected, they were covered with an insulating material as per Code.

The next job was to plumb in the water heater's new 1-inch gas line. This was a straightforward job—simply add fittings and lengths of threaded galvanized gas piping to suit. The pipe was braced with 1-inch Unistrut clamps as it ran down the wall past the tankless unit. It was then plumbed below the heater and into its inlet. Finally, an electrical pigtail was attached to the unit and it was plugged in. Then the final bits of new gas line feeding the furnace were torqued down and the water and gas were turned on to check for leaks and proper operation

As soon as the gas was turned back on, Pangrazio went around to all the threaded fittings and checked them for leakage. Of course this precaution was designed only to get the unit up and running temporarily.

Here it is—operating and ready for inspection. The whole system will need to be put on test and checked again by the inspector when he visits to sign off on the job. Since that wasn't scheduled until after the installation was done (and a day past our deadline) make sure to visit our Web site, *www.reevesjournal.com*, to check out additional project photos.

Valves are Valves, Right?

There is more to Webstone's EXP Isolator tankless service valves than meet the eye at first glance. Photo courtesy of Webstone.

You'll notice this installation used a pair of EXP Isolator hot and cold tankless water heater service valves (P/N 40443) from Webstone in Worcester, Mass. Why? Well, on the market for about a year and a half, these units were designed especially for the tankless water heater market, according to Webstone vice president of sales and marketing Fernando Mirales.

"We have patents pending on them—we were the first to develop anything like them," Mirales said. "Up until we introduced the EXP Isolators, most tankless installations were done with piping and fittings and separate valves and that didn't allow for certain functions to be done."

Mirales said the EXP Isolators allow users or techs to test the entire system right there at the source with those two control valves: "You can also clean and de-scale the system right there at the source," he said. "Before you had to go inside and turn on the hot water and then take readings off the diagnostics on the tankless heater. None of that is necessary anymore—it can all be done right there at the tankless heater."

The reason for this, Mirales said, is that the Webstone valves are full ports all the way through, including the drain portion.

"Before, people were using smaller ball valves or boiler drain hose bibs and you can't get an accurate reading that way to test the diagnostics on the unit because you're not getting full flow through them," he said. "We designed something that is easier for the contractor to install and more beneficial to the end-user for cleaning, testing or any other type of servicing."

For More Info.

For more information on the latest tankless water heaters, visit these manufacturer's Web sites:

Bosch
www.boschhotwater.com

Bradford White Corp.
www.bradfordwhite.com

Chronomite Laboratories Inc
www.chronomite.com

Eemax Inc.
www.eemaxinc.com

Noritz
www.noritz.com

Paloma Industries Inc.
www.palomatankless.com

Rheem Manufacturing Co.
www.rheem.com

Rinnai
www.rinnai.us

Stiebel Eltron Inc.
www.stiebel-eltron-usa.com

Takagi Industrial Co. USA Inc.
www.takagi.com

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