Repiping – The Real Story

by

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1. Should I repipe my house?

Repiping is simply installing all new incoming water lines, replacing the old, failing system. Most people repipe because they have very low pressure, rust in their water, repeated leaks in their galvanized pipes, slab leaks from copper pipes in the concrete floor or leaky thin walled pipes in their walls or attic. Some repipe because the leaks that have caused damage to their house. Many people repipe because a neighbor has suffered extensive water damage due to a catastrophic leak and they know their house is next. They want to prevent a similar incident in their home. Some people get tired of the rust in their water or low pressure. They don't want their family drinking rusty water and would like to have enough water pressure to take a shower or do their laundry.
A properly done repipe will eliminate brown or rusty water, provide an excellent flow and better tasting water. More than one person at a time will be able to shower. It will add to your sense of security, increases the value, desirability and saleability of your home, and prevent future plumbing disasters. A competent repiping company will install a system better than the one the house had when it was built.

A plastic pipe developed in the 1980s, polybutylene, was supposed to replace copper and galvanized water pipes. A breakthrough, better than sliced bread, it was first used in mobile homes and then in housing developments. Polybutylene pipe started failing less than 10 years later, caused untold millions of dollars of damage and a class action lawsuit. This first generation of plastic was a failure and almost all polybutylene homes have been repiped.

You know your house and your neighbors. You will get hints of when you need to repipe, sometimes subtle hints and sometimes large, wet, expensive hints with a great deal of water damage!

The repiping industry started in the 1990s in southern California not because it was the latest fad, but because Southern California has some of the hardest water in the United States. Pipes started failing on a broad basis. Leaks were caused by worn-out materials, rusted out pipe, low grade or defective materials, or bad workmanship. Even a new pipe installation can leak and require replacement if workmanship is shoddy or the material is cheap and defective. That is not good. Galvanized pipes, copper pipes in the slab and polybutylene plastic pipes will all have to be repiped to avoid extensive damage and high homeowner insurance premiums.

An additional note on homeowner's insurance. Your homeowner's insurance will usually pay to repair the water leak and water damage to your home twice. They will not pay to repipe your house. If you have a third leak and damage, your homeowner's insurance company will probably drop you after that. You house will then be registered as 'high risk' in a national database accessible to all insurance companies. Finding a new company to cover your house after the third claim becomes very expensive. Contact your homeowner's insurance company for more information.

If your pipes just sprung their 8th slab leak, creating over $85,000 in damage, it may be time to repipe.
If you notice you've been walking around in 3’ of water in your house for several days, and the water is pouring out the front door and out of the garage, down the street, it may be time to repipe.
If you draw a tub and when you get in you notice that there is a gravel bed of rusty iron 'rocks' or particles in the bottom of the tub that weren't there before, it may be time to repipe.
If it take 9 hours for the washing machine to fill up enough to run a load of wash …
If you've been bringing buckets of water into the house for last 10 years because no water runs in the house, and you just noticed that the last working hose faucet out front is failing … (actual customer!)
If your old galvanized pipes have 'clamps' on them every 2” to fix the leaks …
If your plumber is driving a new Lexus because of the repair work he's done on your house and he told you: “keep fixing the leaks with new copper and pretty soon the house will be all copper”, it's time.
2. What material should I have them use to repipe?

There are several materials that can be used to repipe a house. There is copper, a durable metal that is most commonly used in repipes, and a newer, excellent plastic alternative, PEX. Then there are some materials that you shouldn't use. Each material has different advantages and disadvantages.

CPVC

One of the newer materials is a rigid plastic pipe called CPVC. That's short for chlorinated polyvinyl chloride. It is simply plastic PVC pipe, like the white pipe used in sprinkler systems, that has chlorine added to the plastic to resist algae growth inside the pipe. The added chlorine gives the pipe a yellowish color. PVC becomes brittle over the years, especially when exposed to heat and the sun's UV rays. Then it cracks and fails. CPVC is a glued together system and the glue may be vulnerable to the same deterioration as PVC. If there is a fire, the pipe will give off toxic fumes when it burns, and it will fail. CPVC is an ok choice for those rare areas with extreme oxygenated water or other dissolved gases, vapors or suspended solids in the water that have proven to cause problems for copper pipe. But in these cases, if you do your research you will find the next material to be far superior to CPVC. CPVC is not recommended for a repipe.
**PEX**

**PEX** is a new, flexible plastic pipe that was introduced in the U.S. in the 1980s. PEX is a widely used alternative to copper and it is has gained market acceptance in the US. Europe is installing more PEX now than copper. PEX is short for 'Cross Linked Polyethylene'. The 'PE' in PEX stands for 'polyethylene', the plastic used to make the pipe. The 'X' in PEX stands for 'cross-linked'. The molecules in PEX pipe are cross-linked during the manufacturing process, resulting in a stronger product like woven fabric or fiberglass cloth. Cross-linking makes the tube stronger and gives it some wonderful and practical properties. The main advantage is that PEX is less expensive than copper pipe and easier to install. It is also quiet when installed. Contractors love to install PEX in new homes because the labor is inexpensive and PEX isn't as complicated or time consuming to install as copper. PEX will deteriorate in sunlight and can't be used exposed, outside or inside. One disadvantage is the 'critter factor', critters can eat though PEX tubing, but this is more rare than some copper-loving plumbers would lead you to believe. PEX is a relatively new material and has proven reliable for about 40 years. Test show it should hold up very well into the future, rivaling or exceeding the lifespan of copper systems. People buying a house love to hear, “It's got copper pipe.” But in the future, they may want to hear, “It's got PEX pipe”.

There are many different systems of joining PEX pipe. Different manufactures have different tools, parts and techniques. Joints are usually mechanically joined and not glued or soldered. One system uses clamps or compressed metal bands to hold PEX joints together. This system is *not* recommended as the joining technique can fail. The most widely used PEX system is Uponor. They have over 15 billion linear feet of PEX installed worldwide and have the best system to date. PEX installation and repair requires a trained and certified technician with tools specific the that PEX system. PEX is an excellent choice for areas where extreme oxygen content in the water has proven to be a problem for copper pipe. PEX is a solid option for repiping your house on a budget and it is a slam-dunk material to use if you have an extremely tight attic or if you have a complicated house to repipe or a 2 story house.

There are three different types of PEX. PEX-a, PEX-b and PEX-c. The letters signify different methods of cross-linking the molecules during manufacturing. PEX-a provides the best results, cross-linking over 80% of molecules. A short video describing the Uponor system is here: https://vimeo.com/59320039. Uponor PEX-a is the PEX system I would in my house, or I might use copper.
Galvanized

This new pipe will look like these two pipes in very short order

New galvanized pipe: If someone suggests repiping your house with galvanized pipe, "because your old galvanized pipes lasted 65 years" run away from them as fast as you can! We used to make good galvanized pipe in the United States before the 1960's. Galvanized is simply cast iron pipe with a zinc coating on the inside and outside to keep the iron from rusting. We used to put a THICK coating of zinc on our U.S. made pipe. New galvanized pipe is made overseas with the very thinnest coat of zinc that is legally possible. The seams in the pipe aren't even welded, but simply lapped closed. Galvanized pipe made in the 70's, 80's, 90's and 00's can start to fail after 5 to 6 years of regular use.

Epoxy sprayed into old pipe

Another solution is to spray epoxy into your existing copper pipes to seal the pinhole leaks. There are a few companies that do this such as Ace DuraFlo, Nu Flow or CuraFlo. The costs are similar or greater than installing in a new copper system. Epoxy coating inside residential pipes has not been proven by the test of time. This technology was developed for the U.S. Navy for use on big ships, in big pipes. The technology is about 15 years old for residential applications, so homeowners enthralled with the technology are becoming test pilots for this process.
The original warranty on epoxy coated pipes was only 10 years. Most companies have increased their warranty to a lifetime warranty because of competitive pressure from copper and PEX repiping companies. Spraying epoxy into the small copper pipes in houses could be considered a "bleeding edge" solution. It is impossible to achieve a uniform coating of the inside of copper pipes with epoxy, although the pictures might cause you to suspect otherwise. Some areas in the pipe are sprayed too thick, restricting flow, and some areas to have no protective epoxy coating at all. Another issue; if the epoxy does fail some time after installation and starts leaking, a repair has to be done by a trained and certified specialist with very expensive tools. Some repair procedures are not approved by city Departments of Building and Safety because they use a torch and solder the the leaking area, ruining the epoxy coating in the pipe in that area. If there is a fire near a pipe, the epoxy may overheat and separate inside the pipe. To properly repair fire damaged epoxy coating, if it can be seen at all, the epoxy will have to be redone, even if the original copper pipes are unaffected by the fire.

Not too long ago companies installed epoxy coating in galvanized pipe, but they soon found that the rust from the iron pipe penetrated the epoxy coating and caused the epoxy to fail. Most Duraflow and Curaflow companies will not coat galvanized pipe with epoxy because they know the rust will eventually penetrate the epoxy, causing failure. It is highly recommended that you use some other solution to replace old galvanized pipe.

The epoxy coating salesman will point out that national water purification standards make water so pure that the copper pipe won't properly seal itself after installation. This is a partial, highly exaggerated, truth. Most copper repiping companies offer an excellent warranty and most cities are still using copper in their municipal systems. City engineers know all about this and consider it a very minor issue for their city pipes. Call your local Department of Building and Safety and speak with an engineer if you have any doubts about using copper. For PEX, new water standards are a non-issue.

Another sales point epoxy coating salesman will make is that there are fewer wall openings than during a copper repipe. Copper repiping requires opening walls and those openings have to be repaired or "patched". Epoxy applications do reduce the number of wall openings, but wall openings are easily repaired, even plaster walls. A trained and experienced wall patching technician will leave a wall looking undisturbed once it is painted and the cost is usually on par with the questionable epoxy solution. My opinion is that this is a 'fix-it' solution fraught with future problems and is not a permanent solution such as repiping with PEX or copper.
Copper is one of the more popular material used for repiping, with good reason. The material and technology for installing a copper water system is known, available and widely used. Copper is one of the oldest metals known to man. The Copper Age began in 5500 BC and went to 3000 B.C. followed by the Bronze Age. The first known use of copper pipe in plumbing was almost 5000 years ago, 2750 BC, in the Temple of an Egyptian King, Sa-Hu-Re, in Abusir. Much of that copper pipe is still functional today. We have been soldering copper pipe in the U.S. for 100 years. Safety note: solder containing lead has been against the law since the 1980s and is not used in the repiping industry.

Copper pipe has many excellent characteristics. It inhibits the growth of bacterial and viral organisms, where plastic doesn't. It resists burning and doesn't release toxic gases during a fire like plastic. It is unaffected by ultraviolet rays which cause plastic to deteriorate and become brittle. Copper pipe comes in universal sizes and fittings so it is easily repaired by technicians without the expensive or specialized tools required with some plastic systems. Copper has inherent value as a metal and is easily recycled, making it the most sound environmental choice over any plastic solutions. Most copper pipe comes with a 50 year warranty and some repiping companies will give you a lifetime warranty on it. Copper is
not a brittle metal and will flex during an earthquake and tend to ride out a quake with minimal damage. Copper pipe ensures a clean, safe water supply.

There are different types of copper, and some of them aren't good to put in your house. Copper pipes made in Mexico and Korea are made with recycled copper, which often has impurities in it. The impurities are not visible but can cause the pipe to fail in 4 to 6 years. **You want copper pipe made in the USA.** It isn't made with recycled copper.

Copper comes in two different kinds; hard and soft. Hard copper is straight, rigid pipe and soft copper comes in a roll and can be bent around corners. Both hard and soft copper are 99.9% pure copper, with no additional metals. The only difference is the way they are made. Hard copper is 'drawn' or pulled through a series of hardened steel dies of gradually decreasing diameters. Soft copper is hard copper pipe that is annealed, or heat treated, to soften it. Soft copper is OK for an ice maker line, a dishwasher line. It's also fine to run to a single fixture if installing hard copper would structurally damage the house. But **you want hard copper** on your horizontal lines where the water is flowing rapidly most of the time, because the pipe is hard. This includes the main line from the meter to the house.

There are three types of copper pipe; Type M, Type L and Type K. The letters refer the wall thickness, or 'gauge' of the pipe. Type M, is very thin walled, thinner than a dime. It is referred to as 'residential grade'. But type M won't hold up to hard water in Southern California. It may be fine in areas of very soft water. Type L, called 'commercial grade', is what you want if you live in So. Calif. The wall of Type L is about as thick as a penny. It WILL hold up if properly installed. Type K is referred to as 'industrial grade'. It's about as thick walled as a nickel, and it is overkill for repiping a house. **You want Type L.** These are easy to remember; M, L and K, Martin Luther King. On hard copper you can tell the type by looking at the color of the printing or strip on the pipe. M is red, L is blue and K is green.

Here are 12 questions that spell out the advantages of using copper in your repipe:

1. Does your plumbing material have a long-term, proven performance record?
2. Is it impermeable; can it block contaminants from penetrating its walls?
3. Can the joints withstand rapid pressure and temperature changes?
4. Will it perform well in all weather, and can it be easily thawed, if necessary?
5. Does it resist punctures and abrasions and not become brittle with age?
6. Does it inhibit the breeding of harmful germs?
7. Will it not burn, or give off smoke or toxic fumes, when exposed to fire?
8. Will it withstand the weather and the sun's ultraviolet rays in outdoor applications?
9. Is it maintenance-free and have a low lifetime cost of ownership?
10. Will it add to your home's resale value?
11. Does it have nationwide approval of building inspectors and engineers?
12. Does it have inherent quality and value, or offer 'false economy' like some competing materials?
3. Exactly what are they going to do when they repipe my house?

A copper or PEX repipe is pretty simple. It's construction work and sometimes hard work, but not complicated. We'll show you how it's done as we go. Repiping consists of installing a completely new system for incoming water. A repipe doesn't usually include replacing the drain lines, which carry outgoing water. That is usually called a 're-drain'. Drain lines are NOT copper or PEX and can be repiped if necessary. ABS pipe is the material to use for drain lines.

The repipe will usually start at the water meter out by the street. The crew will dig a narrow trench in your front yard from the meter to the house, neatly slicing out the grass and placing the slice on one side of the trench while putting the dirt from the trench on a drop cloth on the other side. They will go underneath the sidewalk or driveway if needed, come out of the dirt at the house with a shut off valve, and connect to the sprinklers. They will install a hose faucet and take the water pipe into the house.
Once the new pipe is run from the street into the house, the crew will install new pipes under the house or in the attic, running horizontally. Then the vertical pipes will go to the sinks, toilets and other fixtures, usually requiring some walls to be open. New hot and cold pipe is installed to each sink, shower, etc. until all of the horizontal and vertical pipes are all new PEX or copper, including the hose faucets connected to the house. The hot pipes in the attic or under the house will be insulated and the cold pipes in the attic should be insulated, too. This keeps the hot and cold water running more efficiently. Copper pipes will be isolated from the structure of your house to keep them quiet. With PEX, pipe noise is not a problem. Repiping companies typically do not redo sprinkler systems. A good company will install all-new shutoff valves under the sinks and toilets. You want the new shutoff valves to be simple quarter turn valves. They are less complicated, more durable and easier to use than the old kind of valves you have to turn, turn and turn to start or stop a water flow. They will install new flexible lines from the shutoff valve coming out of the wall, up to the sink faucet or toilet tank. You want stainless steel shrouded flex lines to each fixture. They are tough.
This is the time to have a new water heater installed if yours is 9-10 years old or older, or to put in that new tankless water heater you're planning on. If the fixtures in the tub or shower are 25 to 30 years old or older, it's time to install new tub or shower fixtures or 'mixing valves'. They come as kits. The repiping crew is going into the wall, so put new tub or shower valve kits in while they're in there repiping. The law now requires any new valve in a shower, or tub with a shower, to be anti-scalding or "pressure balancing," the technical name.

Once all of the pipes are installed, the repiping crew will leave, with the walls still open and some of the trench in the front yard still open. The next day the city inspector will drop by to look at the pipes to make sure they are the correct size and installed properly, meeting the city codes. Once that is done, the wall patchers will come in and close up the walls so they are smooth, ready for priming and painting, which you get to do. The main line trench will also be buried and the grass squares, which were so neatly cut out, will be put back on top of the dirt.

Your new copper or PEX repipe will allow two people to take showers at the same time, plus kitchen or bathroom faucets to run without disturbing people in the shower. Sprinkler systems can disrupt the water flow in a repiped house because of they demand so much water. So set your sprinkler timers to go off early in the morning, while no one is using water in the house. A properly installed copper or PEX repipe will last as long as your house stands.

Proper installation can make all of the difference in the world. Many plumbers are lazy or unethical and will not remove the sharp burrs inside a pipe that are created after cutting a copper pipe. It's called 'deburring' or 'reaming out the pipe'. If the burr is left in the pipe, the water flowing through the pipe tumbles over the burr, creating turbulence. The turbulent flow in the pipe will eventually pit the inside of the pipe and then eat holes through it. A professional repiper will remove every burr. It only takes 5 to 10 seconds. The low bid plumber won't remove the burrs resulting in failures like the two shown below, and yet another repipe of your home due to leaks. Pipes in a newly repiped home, properly installed, will most often be better than the piping system in a brand new home. That is because the new home was piped by a plumber, the lowest bidder, who cut corners on materials and cut corners on installing the pipes.

Two examples of copper pipe failure due to plumbers not deburring the pipe after cutting.
Copper pipe will radiate or absorb heat easily, that's why it's used in radiators and cooling systems. In your home, you want the heat to stay in the hot water lines, so you want the hot pipes insulated with foam insulation, whether the hot pipes are in the attic or under the house. This keeps the hot water hot and running more efficiently. Cold pipes under the house don't need to be insulated, but you want any cold pipes in the attic insulated to keep the cold running as cold as possible on hot days when the attic warms up.

![Foam insulation used in a repipe](image)

In summary, the best repipe will be with either the Uponor PEX system or hard copper, type L, made in USA, deburred at every cut, properly insulated and isolated from the structure of your house to be quiet.
4. Who should I use to do my repipe?

Repiping is something you only want to do once in the lifetime of your house. It's no fun to have to do it a second time, and very expensive compared to doing it right the first time. Let's focus on doing it right the first time.

If you look in the yellow pages you will find almost EVERY plumber is a “repipe specialist”. If only this were true! There actually are companies that do specialize in copper repiping, but they are few and most of them don't advertise in the yellow pages. You'll find them on-line. We recommend you find one of these dedicated repiping companies to do your house. Why?

An experienced and dedicated repiping company has repiped not a hundred, but literally thousands of homes. They have seen it all, and more. A good repiping crew works like a well oiled machine, doing in a day what would take a several days for an experienced plumber with helpers to do. The repipe crew shows up the first morning, the foreman walks the house with the owner and immediately knows exactly what to do, and how to do it correctly. Then they do it. It is work, but looks simple because the crew is so good at what they do.

Maybe one in ten or one in twelve plumbers will do a great repipe job for you. Contracting is a wild business and you don't always know what you are going to get. A plumber may repipe one house a month or less. Frankly, a good plumber makes so much money, he can't afford to repipe your house...
without charging you an arm and a leg! If a plumber gives you a dirt cheap repipe estimate, watch out. He's probably not going to pull permits, will use cheap materials and cut every corner in the book, and then invent a few more corners to cut. Most plumbers will not give you a warranty in writing unless you twist their arm. They often have little or no concept of providing a warranty on their work. We'll look into warranties in a minute.

Many plumbers will not take the time to debur a pipe after they cut it. Then the turbulence caused by the burr will eventually eat through the pipe and cause leaks. A professional repiping company will take the time to remove the burrs from each cut they make in copper pipe, creating a long-lasting system.

You can find a professional repiping company by doing a web search or check www.angieslist.com. Here are some things to look for in a repiping company:

1. Have they have been in the business for several years?
2. Have they done thousands, or 10's of thousands of repipes?
3. Does the company focus mainly on repiping?
4. Do they have a great warranty that covers materials and workmanship for a lifetime?
5. Do they have a high Better Business Bureau, Yelp or Angie's List rating?
6. Are they licensed by the state you live in?
7. Do they have current Worker's Compensation Insurance.
8. Do they use their own employees?
9. Are the repiping crews and patching crews separate specialists?
10. Do they have references?
11. Will the owner, a crew foreman or senior supervisor be on the job all the time?
12. Will there be an English speaking foreman or owner, on the job?
13. Will the new pipes be installed in a day or two? Or, is it goin to take a month or four?

You want a expert repipe team to do your job, not a plumber with a beer in his hand. Have it done right the first time and the work will last. A good company will be there to fix any problems you have in 10 years, 20 years or longer. Finding a company that doesn't subcontract will save you money. A company we recommend in Southern California for L.A. County, Orange County, Riverside, San Bernardino and Ventura County, is Repipe Pro and can be found on the web at:

http://www.WeRepipe.com/

The owner of the company, Art Hovsepian, almost single-handedly started the repiping industry in Southern California. He started repiping back in the 1970s, in his home country, and never stopped. This is the most experienced repiping companies in California. Art cares about his customers and strives to deliver the best product possible. He wants to earn a referral from every repipe he does. The Repipe Pro number is 855-844-3800.
5. Is a warranty important?

You will find most plumbers offer little or no warranty for their repipe work. That is because they are focused on doing repairs or new construction, not repiping. Some plumbers have a one year or three year warranty, which is horrible. Even the worst repipe, poor materials and poor workmanship, should last five years or longer. Most materials used in a copper repipe have a five year warranty. The USA made copper pipe will have a 50 year warranty. Properly installed, the materials will last much longer than their warranties. A good warranty is a solid indication of the confidence a company has in its own work, and the company's willingness to stand behind their work.

Caution: some plumbers and repiping companies have a trick warranty and it's easy to get caught if you don't know what to look for. What do you want in a repipe warranty? **You want a Lifetime Warranty on both the materials and workmanship.**

The tricky guys will ONLY warrant their workmanship. When something goes wrong they will come out and look at the problem and say; "I'm sorry, but that is a hardware failure, NOT my workmanship, and we'll have to charge you to fix it." So a lifetime warranty on workmanship gives them a HUGE escape clause so they can legally take no responsibility for any problems. Usually these warranties will transfer to a new buyer for free, because they are worthless. Some of these warranties will have a lifetime warranty on workmanship and five year "manufacturers" warranty on parts. Well, the
manufacturer will send you a defective part for free for five years but the repiping company is still going to charge you to install it, because the problem isn't "their workmanship".

The small 'one man band' repiping company may offer you a great warranty, too. Keep in mind this is your house, it usually doesn't cost much more to have work done correctly the first time, and you don't want to incur repairs in the future because a nice guy repiped your house, but you found out later that he was not competent. Can he do it right first time and will he be in business tomorrow, next year and 15 years from now, to back up his work if you need help with it?

A good repiping company will cover the workmanship and materials (except for moving parts or electrical components) for as long as you own the house. You'll see it clearly spelled out in their warranty without having to search for it in fine print. These warranties can be passed on if you sell your house, usually for a reasonable fee. They do have real value. Don't fall for the warranty that only covers workmanship. They're not giving you anything.

6. The 'yes sir' plumber

Every once in awhile you will run into a plumber who will give you a great price on a bid and you'll think, "this looks really good". But his bid isn't backed up with a written warranty or any real paperwork, so you're not sure he's going to do a good job. You decide to clear this up with him but have to play 20 questions to do so: “Are you going to use type L copper?” He answers, “Yes”. Then you ask: “Do you have a lifetime warranty on workmanship and materials?” He says, “Yes” and scribbles the warranty on the estimate to put it in writing. So you think you've got a really good thing going and ask him: “Are you going to debur all of the cuts you make in the pipe?” He answers, “Yes”. And this goes on with pulling permits, using hard copper, pipe insulation, isolating the pipes, etc. What you've done is pull the right answers out of the plumber because he didn't have them for you in the first place. Now you feel assured that you'll get a repipe that rivals work done by a quality repiping company. I call this guy the “Yes sir’ plumber because he'll say 'yes' to everything you ask him, but he hasn't volunteered anything.

You may find the 'yes sir' plumber will estimate his job few hundred dollars below a competent and efficient repiping company. The estimate will look attractive, but could be the most expensive few hundred dollars you'll ever save. Some big surprises might including inferior workmanship that sabotages the plumbing system or the plumber taking 3 weeks (oh, he forgot to mention how long it would take) to do a job that a professional repiping company will do in 2 or 3 days.

Unfortunately, the 'yes sir' plumber is trying to fill in the blanks that he didn't know existed. You may have a good price, but you won't get the quality of installation or the quality of materials that you are expecting. The 'yes sir’ plumber is not on top of his game and cannot deliver the excellent job that a strong repiping company will do.
7. I'm thinking about going tankless.

Tankless water heaters have been catching on in California and other parts of the U.S. since 2003 because they 1) provide an endless stream of hot water and 2) save money on your gas bill. There are a few other points that you should consider before committing to a tankless water heater.

Tankless water heaters are expensive to buy and install. They are usually 3 to 5 times more expensive to install than simply replacing an existing tank type water heater. Some tankless water heaters will require a larger gas line than a normal water heater because they have bigger burners. They also require larger vents, sometimes stainless steel, to exhaust the burners heat. Those larger, stainless steel vents are expensive to buy and install. It will take about 8 to 9 years recoup the upfront purchase expense in gas savings, compared to the costs of simply replacing your standard tank water heater.

Tankless water heaters require regular maintenance that normal water heaters don't. The heating core of a tankless needs to be acid washed periodically. Check with your manufacturer for recommendations on servicing and find out what the service costs are and how often it is recommended to be done. A water softening system on your house or a magnet-type water treatment system may extend the maintenance period significantly, but requires yet more up-front costs to reduce the long term expenses.
Tankless water heaters are complicated and cannot be serviced by the average homeowner. Look at the inside of one. It looks like a car engine in there. If something goes wrong, you and a buddy aren't going to run down to Home Depot and pick up another tankless water heater and get it installed just in time for the Super Bowl. You have to call a service technician and wait for him to come out to your house to correct the problem. How long will that take? You'll have cold water until the tech repairs the problem.

Many tankless water heaters require electricity to ignite the burner. Some have a battery backup for the igniter and others don't. If a storm or high winds cause the power to go down for several days, you may be without hot water. You can't pull the cover off of your tankless water heater and light the burner with a match. If the electricity goes out with a normal gas water heater, you would still have hot water because your gas line is still working. 
Two last points about tankless water heaters; 1) they actually take a bit longer to get hot water to their destination. This is because once you turn on the hot water, a sensor in the tankless water heater senses the flow and turns on the burner, which THEN heats the water and starts your endless stream of hot water flowing to the sink or shower. A normal water heater starts hot water running toward the sink or shower when the hot water is turned on, immediately. 2) The burner on a gas tankless water heater can be noisy because it is much bigger than one on a regular water heater. This is not true for electric tankless water heaters, of course.

This is not meant to discourage you from getting a tankless water heater. These are simply some points to evaluate when making a decision. Many people love their tankless water heaters and find them worth the money. A tankless water heater is an ecologically friendly investment.

Some good uses for tankless water heaters are; 1) a house where 3 or more people are taking showers back to back or taking long showers, 2) a guest house that is seldom occupied but a tankless will provide hot water for guests when needed without keeping 30 or 40 gallons warm for months without usage, 3) a mountain vacation cabin where you drain the hot water system in the winter when you leave or you are not in the cabin for months on end. 4) you have a large Jacuzzi tub that a regular tanked water heater can't fill with hot water and 5) tankless water heaters take up less space and may free up a closet for storage. For two people in a 2 bath house, a 49 gallon normal 'tanked' water heater would probably be the simplest installation.

**CAUTION:** if you install a tankless system that is UNDERPOWERED, or too small, you will never be happy with it because it will not supply enough hot water for your house. We recommend the Noritz brand. See www.noritz.com for further information. Their brochure clearly shows the model number required for the demands of a typical house.

**Recirculating Systems:** An alternative to installing a tankless water heater is to install a "recirculating system" or 'recirc system', as it's called. A recirc system will run hot water through the house in a loop to all of the fixtures with hot water, providing nearly instant hot water to each fixture. A recirc systems works well with a normal tank water heater. You would not want a recirc system on a tankless water heater because the burner would be running unnecessarily to keep the water in the recirculating loop warm even when not in use. Thus it will be expensive to operate, defeating the purpose of a tankless. Recirc systems save water, so they are ecologically friendly. They are inexpensive to operate and may actually pay for themselves over the years in water savings. A recirc system should cost roughly the same as installing a tankless water heater, if done during a repipe. Be sure to have a timer or sensor (Aquastat) installed to turn the recirculating pump off and on so it doesn't run 24/7. I prefer the Aquastat sensor. It does a great job, runs about an hour a day, and you can add a timer later for more savings.
8. What about the drain lines?

Drains – rusting

Drains looking worse – clogged and rusted through

Looking great! Drain lines replaced with all-new ABS plastic that will never rust.

The pipes that take the water out of the house are called drain lines. When you take a shower, flush the toilet or turn on a sink, the water goes down the drain and out to the sewer in the street, or out to the septic system if you live in the boondocks. Drain pipes usually last 65 years to 75 years but individual drain pipes may fail earlier due to homeowner usage, faulty insulation or tree roots. The repiping crew may see a single drain that has failed or is failing and offer to replace it. Sometimes all drains need to be replaced when the repipe is done.
Drain line pipes are usually galvanized and cast iron pipe. Sometimes the sewer main between the house and the street are made with a terracotta, that's vitrified clay, type of pipe. Houses built starting in the late 1960s to middle 1970s, and later, have a drain system made with rigid black plastic pipe called ABS. It is technically Acrylonitrile Butadiene Styrene, but lets stick with ABS.

ABS pipe is great stuff. It's tough, resists most chemicals, is smooth and never rusts. It's what you want in you drain system. It will 'boil' in a fire and then burn very hot, but for drains, it's the right material. The life expectancy of ABS has not been determined but an educated guess would be easily in excess of 100 years, if properly installed.

If you need to replace the 'main drain' line, or sewer main, from the house to the street, there are three solutions. The first is to simply digging a trench between the house and street connection and install a new ABS sewer main. When that can't be done because of some expensive landscaping, concrete or other obstructions on your yard, a second solution is to have a 'trenchless' main line installed. Trenchless installations are done by opening up the main drain pipe at the house and at the street and sending a 'torpedo' up the old sewer main that breaks up the old pipe and pulls a new ABS drain pipe in behind it. A third way to replace your sewer main is by 'lining' the sewer main with a fiberglass liner. The liner goes into the existing pipe, sealing out roots and dirt, and providing a long-lasting and rugged fiberglass drain. Lining an old pipe with fiberglass is probably the most expensive. Any and all of these three solutions work well. Simply digging a trench and installing an ABS sewer main will usually be the least expensive.
9. How much will it cost?

There are no set prices between repiping companies. It is an extremely competitive industry in Southern California, and that works in your favor. The price of copper has been on a roller coaster ride since 2000, starting at a bit less than $0.50 a pound and exceeding $4.00 a pound and back down to the $3.00 plus range. Call a company and have an estimator come out to give you a free estimate. Be sure it's a free estimate. If you need drain lines replaced on a raised foundation house, the cost to do the drains is usually about the same as a copper repipe, plus or minus about 10%.

A repiping estimator is required by California law to be licensed and give you a written estimate. The estimate must include the cost of the repipe, the scope of work or what will be done, and a description of the materials to be used. If an estimator or plumber writes a number on the back of his business card or talks with you over the phone and gives you an estimate, he has broken the law before even touching your house. He may not be the contractor you want to repipe your house.

We hope this information has helped you evaluate and navigate the options involved in repiping your house. We wish you a successful repipe installation that is reliable, maintenance free, increases the value of your home and that you enjoy for years to come. If there is more that we can do to help you with your repipe or anything we can do to improve this publication, please call us at 626-379-1609.
10. About the author

This material has been compiled by over 15 years of direct experience within the largest copper and PEX repiping companies in Southern California. The author has a degree in Business Administration from Arizona State University, including training in construction, (civil) engineering, marketing and real estate. He worked over 12 years supervising high rise concrete construction in the Washington D.C. area. He could repipe your house and would do a great job but it would take him about several times longer than an excellent repiping crew...and probably cost more.

END