

THE

US

Boiler Report



Published by U.S. Boiler Company
Manufacturer of Burnham® Brand Products

March, 2018 • Vol 6, Issue 3

TANKS... a LOT!



In this issue of the U.S. Boiler Report, we have articles featuring two of the three tanks pictured here, and the other is a 60-ton war machine practicing drifting at speed on an icy road. More on the last one later, but let's talk about the other two first.

Consider the humble but proven and reliable indirect water heater. High efficiency combi boilers are all the rage now, matter of fact U.S. Boiler now has two models available with the K2 Combi and the Aspen Combi. Two great choices, but some families have hot water needs that can only be satisfied with the virtually limitless capacity of an indirect water heater. What makes them virtually limitless? Well, the boiler supplying the heat to these tanks can do so at a rate which is actually greater than the rate of water leaving the tank... virtually limitless! These tanks are a time proven commodity, but they are not without their foils. The biggest

of which is water quality. Thankfully the Alliance SL is one tank that's designed from the inside out to handle hard/acidic water better than most. On page two, one of our installers talks about exactly that. In addition, Ron Beck tackles DHW questions and a bunch more in his monthly Beck Tips, and our contractor feature spotlights an installer in Connecticut who regularly includes Alliance SLs with his boiler installations.

This month's final feature is about a tank of another kind; domestic oil tanks. Specifically it's about



a time long ago when repairing, instead of replacing, one of these tanks was something that was fairly commonplace.

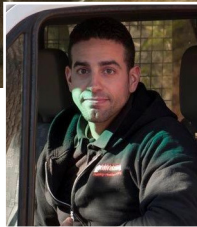
OK, we promised more about the ice drifting tank image that we used to get your attention, and we are going to deliver. No there's no article about that in this month's issue, but if you're so inclined to watch tank crews actually practice drifting around the corner of an icy road, you can see it for yourself by googling "M1 Abrams ice drifting" or by clicking [HERE](#). Just be sure to read this issue first! Many tanks, and enjoy this issue of the USBR!

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By Anthony Tosco, owner of Avanti Plumbing, Heating and Cooling

Rock Solid

But, I'm done complaining. Solutions make for better conversation.

As our company name implies, we're a full-service HVAC/P company not far from Philadelphia, PA (sorry for your luck, Pats fans!). My personal favorite type of work is hydronic heating.

One huge benefit about hydronics is the ability to provide bountiful, efficient domestic hot water through the use of a sidearm tank. It also means that I can install what I believe to be the longest lasting indirect-fired water heater on the market; the Alliance SL (Stone Lined). Considering that my area has some of the worst water quality in the nation, it's good to have a product that can handle it.

Hard water scale (calcium carbonate) is a problem in our area, though it is harder in other parts of the country. I've tested the water in more than enough homes to know that our water can be acidic, too, which I think is our biggest issue. I've seen tanks fail in as little as two months! Many of the homes in my territory are served by one of the oldest water distribution systems in the country. The Northeast, in general, has poor water quality, and we're among the worst.

Seven years ago I replaced an oil boiler system in an old home. The previous system had an indirect tank that, according to the owner, had been replaced roughly every three years since he purchased the home. I started asking around to see if anyone knew of a sidearm tank that could stand up to the abuse, and a friend of mine that worked at a supply house told me about the Alliance SL tank. I think his exact words

were, "They're heavy, but you can set a bomb off inside of them."

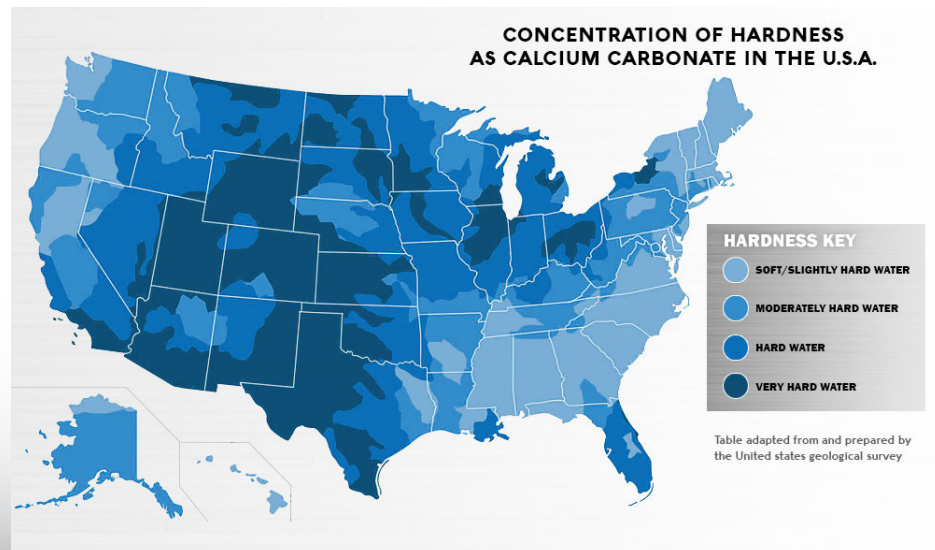
So I installed the Alliance in conjunction with an MPO-IQ. In those seven years, I've never been called back once. Now I average about half a dozen Alliance installations every year.

I've come to learn that the weight of the Alliance is its *only* drawback. After all, if you install one, you're not going to be replacing it, so it's not a big deal. What surprised me was that the price tag is extremely competitive when compared to other purportedly long-lasting alternative, like stainless tanks.

If there was a case study that pitted the Alliance against high-end stainless tanks, my parent's house might be as good as any. When their stainless steel indirect tank sprung a leak less than a year after it was replaced, I installed an Alliance SL. Mom hasn't called to scold me in Italian yet. So I think we're good. I've had one in my own house for nearly 10 years now, again with no problems.

So how does the Alliance stand up to poor water in ways that other tanks can't? It's built in a way that other tanks aren't. The inside of the steel tank is lined with Hydrastone, a form of concrete that makes the Alliance impervious to nearly all water quality issues. This method of construction is so effective that anode rods aren't

– Continues, see "Solid", page 8





Do you ever feel like a wind-up doll? And that you have to wind yourself up every day? Well, you do! And if you don't, who will? It takes discipline. Here are my Top 4 Tips for renewing your passion for your business:

#4. Work up a sweat

You know working out is good for you, but it's also good for business. There is nothing like physical exercise to clear out the cobwebs, reduce stress, come up with a great idea and improve your morale. Do something every day, anything, that causes you to break a sweat. It could be as little as 10 minutes of running, brisk walking, climbing stairs, or a few sit-ups and planks in your office. When you most don't feel like it...do it, because you will always be glad you did. You will never wish you hadn't.

#3. Let him or her go

How much time have you wasted fretting about whether or not to let an employee go, when you KNOW in your heart and gut that it is the right thing to do? Clear, written expectations and systems make it easier for both of you to know whether or not the relationship is working. Put in the systems, and listen to your intuition. You have the right to go to work without a sickening feeling in the pit of your stomach. And, you are wasting so much time...yours and his or hers... when you keep a bad relationship



going. It doesn't make you or them bad people. Sometimes it's just not a good fit, so let 'em go. You will feel better.

#2. Listen to good news

What if you just didn't watch the national news? What if you didn't click on the news blogs first thing every day? Instead, what if you clicked on www.TED.com and listened to 15 minutes of a bright, mind-expanding presentation? I suggest you search for [Simon Sinek](#) or [Maya Penn](#), or take a chance on a fresh voice. Don't listen to talk radio! If you are so inclined, read the Bible or your favorite religious tome. Drench your mind with powerful, positive thoughts. The energy is contagious... and motivating.

#1. Have a weekly meeting with YOU

Take an hour, once a week, and ask the big questions. What do you want? What do you want your company to be? To look like? To feel like? What are your sales goals? What is your bottom line? How can you be of the most service? How can you best express your unique gifts? How can your company help you serve your

highest purpose? Review your to-do list...what you have to do, what you want to do and what you could just not do.

Then, block out specific times in your calendar for the week. Include time to work on projects that will move you in the direction of what you really want. Don't worry about making the wrong decision. The more certain your intention, the less effort required to bring your vision into reality. Nice, right?

"I have learned this at least by my experiment: that if one advances confidently in the direction of his dreams, and endeavors to live the life which he has imagined, he will meet with a success unexpected in common hours."

~Henry David Thoreau

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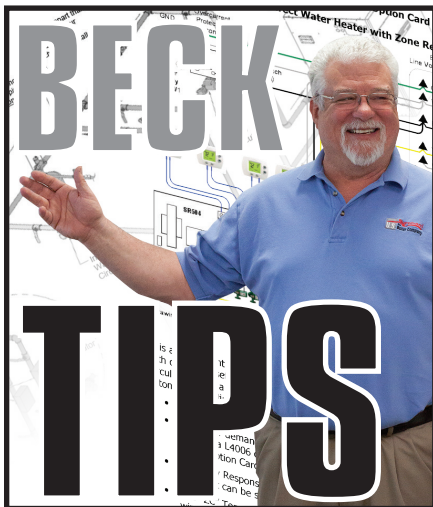
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By Ron Beck,
U.S. Boiler Company

This is part 2 of an interview between me (R) and a fictional character named "Joe Contractor" (J).

R - Welcome back Joe! We started our interview last month talking about multiple boiler installations. You had more questions and wanted to continue the interview this month. Last time, we briefly discussed the Sage2 control and how we can mix Alpines, Aspens and K2s and even combi's models together and any one of them can be the master. We also discussed when we needed a header sensor and when we did not. What other questions do you have?

J - Hi Ron, glad to be back. Yeah, last month's conversation was good but it really prompted many more questions. I might as well jump right in; Before we get too deep into any subject can we do a quick overview on the installation of multiple boilers?

Joe Had to Ask (part 2)

R - Sure, the easiest way to do this is from a "10,000 foot level". Here is my list start to finish:

1. Properly size the boilers.
2. Determine the required DHW demand.
3. Choose the best way to make domestic hot water (Using either combis or indirect water heaters).
4. Determine if you will need a header sensor. (See last month's article)
5. Familiarize yourself with the product venting and combustion air from the installation manuals and local codes.
6. Pipe all boilers to one connection point. Boilers should not have separate system connection points.
7. Choose a Master boiler and adjust the controls properly
8. Check gas pressure at static, light-off and high fire, compare to min/max pressure on boiler label.
9. Do a complete combustion test on all boilers in high and low fire, adjust as needed. Note: 10:1 boilers require a high and low combustion test and the low fire O² must be equal to or greater than the high fire O².
10. Redo gas pressure check with all boilers in high fire to verify the inlet gas pressure is still within spec.

J - That is painted with a pretty broad brush. Let's talk more specifics; My next question would be, looking at your steps above and last month's interview covered the first four steps, can I common vent the boilers? In other words, run all the vents to a common vent pipe.

R - No, we do not want to see this application. We have ok'd common air intakes – if sized properly – on a job-by-job basis. We do not recommend common air intake pipe sizing, or common venting. We allow venting in PVC, CPVC, ridged polypropylene, flexible polypropylene, stainless steel, and flexible stainless steel on some products (see the Installation and Operation manual for details). We also allow two pipe through the sidewall, two pipe vertical, concentric (both vertical and horizontal), vent through the roof and air intake from a sidewall. You will have to check the installation manual for the specific product you will be venting.

J - I see, I know a large part of the Installation and Operation manual is dedicated to venting. My next question will be about piping the boilers. Do these boilers have to be piped primary/secondary to the system?

R – Yes, they do, but there are many options when we

do this. They can be piped to one set of closely spaced tees. We do not want each boiler piped into the system piping with its own set of closely spaced tees. The boilers will be piped into a common supply and return header to a set of very closely spaced tees.

J - Is that the only way to pipe multiple boilers?

R - No, you can pipe the boiler common pipes into a low loss header or buffer tank. Many prefer to pipe the boiler common pipes as reverse return although with all boilers having their own circulators I personally do not think it makes much difference if it is reverse return or not but if you want to use it be my guest.

J - I have piped a few primary/secondary applications with closely spaced tees, and for ease of purging, installed a ball valve to assist in purging the boiler and system. Was this OK?

R – When piping primary/secondary utilizing closely spaced tees there should never be anything installed between the tees. In fact, the tees should be set as close as possible. If you get the tees within a 1/2" to 1" between the tees, that is great. Paying attention to the distance between the tees is important but don't forget the distance from elbows before and after the

– Continues, see "Beck Tips", page 8

Creating Lifelong Customers...



There are a million and one different business models out there, offering varying degrees of success. Some focus on sales, others on service.

For Modern Heating and Air, in Milford, CT, the overarching theme is to strive for 110 percent customer satisfaction. They've discovered that this is the way to create not only a solid return customer base, but a lifetime customer base.

"Making every single customer happy is our A1 priority," said founder Matt Sando. "Educating the homeowner on the front end, paired with a no-pressure sales approach are big steps in that process."

The small but growing firm doesn't have salespeople. Its technicians are its salesmen, and the approach seems to be well received.

"A tech can provide the customer with better

information than a salesman can, especially in a retrofit situation," said Tom Stags, lead technician. Because of his experience in diagnosing issues with all types of HVAC equipment, Stags can usually be found on "problematic" jobsites.

Sando and Stags worked together for a large heating company when they started their careers. Sando left first, with a vision to change the way both customers and employees are treated. It wasn't long before he recruited Stags to Modern.

Hydronic Options

Admittedly, great mechanical aptitude doesn't always coincide with great people skills; a good tech isn't always a natural communicator. But careful selection of employees and ample training afterward have cultured the Modern crew into a powerful problem-solving, customer-serving force.

"Our customers get numerous budget options

after assessing their needs" said Sando. "Explaining the differences is critical. We provide all sorts of product literature, and give them time to do their own research online. Most of the time, customers feel the need to do this anyway, and pressuring them is never beneficial."

Hydronic retrofits likely offer the most options to present to a homeowner, and require the most explaining. But boiler systems are big business in CT, accounting for roughly half of Modern's work. Oil-to-gas conversions are still going strong, due in part to a \$750 rebate to the homeowner when a condensing boiler is installed.

Sando has been using Burnham brand products for 15 years, even five years before he founded Modern.

"We install a lot of Burnham Alpine boilers," said Sando. "But again, we like to give the customer options. Even with the rebate available on the high-efficiency Alpine,

people still go with the ES2 cast iron boiler from time to time. With outdoor reset capability, the ES2 is a great package. And for oil, we recommend the MPO-IQ."

"One of the challenges we face, and I'd assume it's the same for any contractor, is that new equipment benefits from proprietary training," continued Sando. "It's this way across all brands. If you want your techs to be capable of quickly and efficiently installing equipment and diagnosing issues, you almost have to standardize on equipment. We made that call with U.S. Boiler products years ago and haven't deviated."

Modern has also standardized on the Alliance SL, though not so much because of training

– Continues, see "Lifelong", page 6

–“Voight”, continued

they’ve received on the robust indirect-fired water heater, but rather because it’s a consistent performer in spite of the hard and corrosive properties typical to the water supply in CT. They’ve found that the Alliance resists the abrasive properties in both well and city water.

A Great Combination

A recent oil-to-gas conversion had two Modern technicians at an older home in Fairfield, CT, for two days. It presented the typical challenges with the tried-and-true solution.

“Like many of the homes here, the house was built in the 1920s,” said Sando. “It’s about 2,200 square feet. Low ceilings and tight doorways always make for a good time getting equipment in and out.”

Day one was occupied with two technicians running new gas pipe and pre-piping the near-boiler circuit as much as possible. They also set a 50-gallon Alliance sidearm tank. The job took place in December, so having much of the work complete before taking the existing boiler offline was a big advantage. The home only went a few hours without heat.

On the second day, it was time to cut out the old boiler and pipe the 105 MBH Alpine condensing boiler up to the two-zone copper baseboard system. The water heater was piped as a third zone with priority.



When an oil-fired boiler is used, Modern always looks to the durable, efficient, feature-rich MPO-IQ.

“Unless we get a strange request from the homeowner, we use the Alliance SL on all of our hydronic systems,” said Sando. “We like them for a number of reasons. They’re short, and the tappings are on the top for easy connection. The recovery rate is very impressive, and they just last longer than anything else we’ve tried.”

Modern Heating and Air has Alliance SL tanks in service that are 15 years old, and Stags has only replaced three coils. If it’s needed, the coil pulls out of the top of the unit, meaning the tank doesn’t need to be drained before the repair.

The Alpine and the Alliance are two products that Modern has grown accustomed to and utilized on a reoccurring basis to solve the problems that their hydronic customers have. According to Sando and Stags, they use them because they work. And they use them because they know how to install them correctly. But even the best products

won’t perform as intended if they aren’t installed properly. This, according to Modern, is one of the biggest challenges facing condensing boilers.

Doing it Right

“I hear a lot of horror stories about customers getting used by HVAC companies, and I often see the aftermath,” said Stags. “There’s nothing we like more than turning that frown upside down. But the fact remains that both contractors and equipment get a bad rap when so many systems aren’t installed properly. This is especially true with condensing boilers.”

According to Sando, plenty of high-efficiency boilers aren’t living up to their name simply because the piping is wrong. If the boilers aren’t installed in a way that they can condense, the units are really just conventional boilers with a higher price tag.

“As contractors, we have an obligation to deliver every ounce of efficiency and

longevity that the customer has paid for,” he said. “And by default, that means that we have an obligation to educate ourselves and our employees on best practices and proper installation per the equipment we’re installing.”

“Training is vital, not only for the customer and your company, but for the hydronic industry as a whole,” he continued. “Just do it right. We’ve found that to be a great business model.”

EDITOR’S NOTE:

Are you a professional heating contractor that is interested in getting up-to-date on hydronics as well as getting “under the hood” of the latest products and boiler control systems? U.S. Boiler Company offers multiple training opportunities at their Lancaster, PA location. For information on attending these sessions, please contact your local sales representative of Burnham brand boilers for more information. Your wholesale distributor will be able to provide you with contact information.



Patching Domestic Oil Tanks?

Yes, that actually happened!

By Dan Vastyan

I never thought I'd begin an article like this... but I saw a strange photo on Instagram a while ago and wanted to learn more. The image showed a 275-gallon fuel oil tank in a dirt-floor basement. The vessel had a large steel patch across the top and down one side, and the guy who posted it @Tstags said that the tank had been "relined", and was dated back to the 1970s

Along with things like green vinyl furniture, window fans, the polio virus, men's short shorts and bell bottom jeans, the practice of relining oil tanks is something I'm sure we can all agree, we're better off without. There are new, state-of-the-art methods of relining commercial oil tanks today, but I'm talking about the old way, with elbow grease and fiberglass.

How and why were oil tanks re-lined, and when did it become unacceptable to do so? I wanted to know. I've never seen one of these Frankenstein tanks myself, and most of my local contractor friends here in Pennsylvania had never heard of it either.

To make a long story short, I posted a question on the Oil

responses, mostly from guys in New England. Funny how social media has become a fantastic way to interact with others in our industry, isn't it?

Rick Glownia was one of the guys who answered, and he and I caught up on the phone shortly thereafter. Rick started his career in 1974, in the Service Department of Automatic Comfort, East Hartford, CT, and later became a service manager for 11 years. Today, he's a manufacturer's rep with JAD Associates in Bristol, CT.

The information below is almost entirely from Rick, and I'm very thankful for his willingness to shed some light on the topic. He also called George Fantacone, of Santoro Oil, and Nick Micheletti, owner of Micheletti Oil Services, to learn more. For these guys, this topic was a blast from the past.

The Process

If you're from the great state of Connecticut, you have very likely seen relined oil tanks. It's also not a rare sight in Rhode Island, Massachusetts, and parts of New York. And if you're from the era of rotary phones, you might even

have witnessed the process firsthand.

I couldn't find any dates to indicate when the tank relining practice was developed, but Rick tells me it wasn't new when he started in the industry in '74. From what I understand, it was common practice through the early 80s, at which point real estate inspectors made it hard to sell a home with a relined oil tank.

The process included grinding down the belly of a tank where a pinhole(s) existed and applying a fiberglass bonding compound. This was typically done from the outside of the tank. Workers would pump the oil out of the tank, flip it upside down, grind it down and apply the fiberglass. They would then use large heat lamps to rapidly dry the compound, re-set the tank, and fill it up.

This worked very well on most occasions. Once in a blue moon, the patch would fail and oil would seep through the pin holes and create a bubble in the fiberglass. In this case, the tank was generally replaced.

In a situation where the tank couldn't be flipped upside down, for instance if the legs had been concreted into the floor, a large segment of the tank was cut off the

top, providing access to the inside. The tank was then squeegeed and wiped clean, and the patching process was completed from inside the tank. When finished, the sheet metal was welded back into place.

Underground tanks, even big ones, were often fixable too. This was done from the inside of the tank. The tank relining service did the excavation, patched the tank, and regraded the soil. If concrete or asphalt work was needed to take the site back to original condition, a different subcontractor came in later.

The Business

Most oil companies didn't actually reline tanks in-house. Instead, they used a tank re-lining subcontractor. Some oil dealers simply hired the reliners as-needed, and others implemented programs.

Rick tells me that one company he knows of offered a tank insurance program, or "tank protection". In the early '70s, it cost the homeowner \$1.95 per year. The oil company then paid a relining service \$1.75 per tank, and pocketed the extra \$.20. If a leak occurred, the relining or replacement of

– Continues, see "Patch", page 8

–“Solid”, continued

needed, and a 10-year warranty comes free. A lifetime warranty can also be purchased.

All connections to the finned copper heat exchanger are on top of the unit, so all work takes place at waist level, and very little side clearance is required. If the heat exchanger were to need replacement, all you need to pull a few bolts, and the coil pulls up and out of the tank without needing to drain the unit. US Boiler Company includes a T&P valve with the unit, too.

The design of the tank helps limit scale buildup on the heat exchanger, because cold water enters the tank through a diffuser that shoots cold water in a 360-degree pattern across the heat exchanger. Fast water movement across the coil reduces mineral buildup. And by putting the coldest water in direct contact with the hottest surface, the recovery rate is improved.

But what good is fast recovery if the tank can't retain the heat? The Alliance SL has a two-inch layer of dense foam insulation (R-16). The 70-gallon model - one of five sizes - loses less than

half a degree per hour under normal conditions.

I usually install a thermostatic mixing valve on all my indirect tank installation. Because it's really well insulated, I keep the tank over 140°F to be sure that there's no chance of legionella bacteria growth.

If you're in an area with really hard or acidic water, the Alliance SL should be on your radar. I'd say that your customers would thank you for it, but you probably just won't hear from them until it's time to service the boiler.

–“Patch”, continued

the tank was left up to the subcontractor. By the time the company stopped offering tank protection years later, it cost homeowners \$29.95 per year. Tank protection was not offered for underground tanks.

Brothers Herman and Theodore Brand, both of which are no longer available for comment, ran a relining company called New England Tank Relining out of Fairfield, CT (not to be confused with New England Tank Services). Despite the name, they operated almost entirely within CT. Bond-It was another small company that provided the same service throughout New England.

Because oil companies didn't generally do the work themselves, oil technicians were trained to assess a tank leak when they visited the home. If the leak was along a seam, near a leg, or simply too bad to patch, the tank was replaced. Every now and again there was some sort of incidental expense that the homeowner was responsible for, like a new tank gage, but otherwise, the replacement or relining came at no cost.

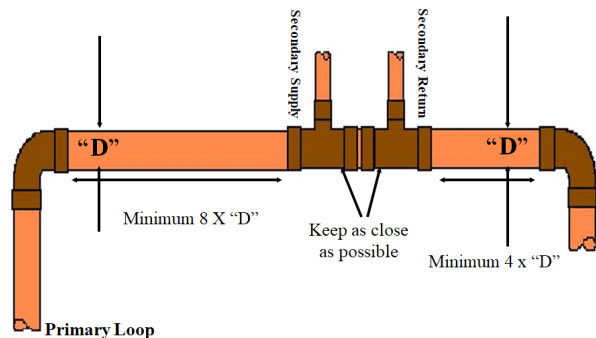
If the owner of a leaking tank wasn't on a protection plan, two quotes were given; one to reline, one to replace. In that situation, the subcontractor simply invoiced the oil company for the work. This also included a 10-year warranty.

But that warranty was obviously not extended to customers with tank protection, or they would just stop buying the insurance.

I've always found the history of our great industry very intriguing. I'm quick to reach out to those that have been in it a long time. They don't just know HOW things are done, they usually know WHY. I guess the moral of the story is that one great way to learn about the past is through new technology. Without Instagram, Facebook, and Rick's willingness to share his time with me, the photo of that ugly oil tank would just be... well... a photo of an old oil tank.

–“Beck Tips”, continued

close spaced tee's. See illustration below, flow is left to right.



J - I have read in other articles you wrote getting the tees as close as possible is always a good idea. What is the benefit of that?

R - It is all about hydraulic separation. This means the flow of one pump will not affect the flow of another pump. The more resistance you have between the two tees the more the flows can be affected by each other.

R - Joe I hate to tell you this but we are out of time again. See you again next month?

J - You sure will...I still have more piping questions. See ya then!

Ron Beck is Outside Technical Advisor and Manager of Training for U.S. Boiler Company, where he's been since 1998. Ron's 34 years of experience in the heating industry include climbing the ranks of a HVAC company, from apprentice to service manager. Ron can be reached at:

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