

Narrowboat underfloor heating

Can it be done, does it work and is it worth it?

The expansive internal layout and domestic look and feel of narrowboats and widebeams lend themselves well to the concept of underfloor heating. Some systems have succeeded where others have failed, so when Eberspächer UK's inland waterways heating expert, Peter Collard, came across one system that worked particularly well, he was keen to find out more.

AS EBERSPÄCHER'S marine technical engineering project manager, I am responsible for, and have been involved with, a great many different narrowboat heating system designs.

Among other things, I have been involved in a number of narrowboat and widebeam underfloor heating projects. Although all have worked, there have been varying degrees of success!

Until now, the boats I have been involved with would normally be fitted out using adapted household underfloor heating kits. Although these accomplished the job they did have several drawbacks, namely, household underfloor heating kits use relatively small internal diameter plastic pipe to heat under the floor.

This pipe requires a relatively large power-hungry water pump, sometimes requiring a household 240v pump. These small pipes are normally plumbed into a complex water manifold delivery system and thermostatic mixer valves to regulate the amount of heat being sent under the floor and to control zone temperatures.

Valuable head height can be lost to thick underfloor insulation, pipe mats and over floor covering. These all serve to raise the height of the finished floor.

So can it be done? Absolutely! But there are a few issues to get over. The first, or so I thought, was floor temperature. A diesel-fired heating unit, like our Hydronic range, for example, will generally heat the heating system to between 75C and 85C (depending on manufacturer). I couldn't

envisage putting 85C water under the floor! I kept having the vision of someone getting out of bed and hopping around like a cat on a hot tin roof!

The second is floor area. You will need enough floor area to overcome the heat loss of the area you are trying to heat and as underfloor heating is relatively gentle, low-temperature heat, you need a relatively large floor area. Not something you usually find in a narrowboat bedroom, for example.

The third is flow rate. The last thing you want is a large powerful water pump draining all the amps out of your batteries.

The fourth is head height; walking through your boat with a permanent stoop if you're over 5ft 8in tall will become tiresome.

So when one of my customers said he had solved all of the above, I must admit I was a little sceptical at first. Especially when he mentioned he was putting 85C water directly through the underfloor pipework! This I had to see for myself.

Does it work? Well... yes! It worked extremely well in fact. The customer in question was JD Narrowboats, based at The Wharf, Shardlow, in Derbyshire. After meeting Andy Darken, one of JD's directors, he was kind enough to invite me up to test one of his boats. So, one autumnal day last year, I popped up to Shardlow to monitor a new boat's underfloor heating over a six-hour period.

The first thing that struck me: the boat did indeed have full head height. With no radiators or pipework plinths, it also



PHOTO: WATERWAY IMAGES

looked clean and extremely roomy, in fact it looked and felt like a 9ft boat rather than a 6ft 6in. The design was very open-plan, and this served to give the boat a nice large floor area, even the furniture was up off the floor on wooden legs. This allowed maximum efficiency from the floor heating.

Having connected the Eberspächer heater to my laptop, I began monitoring the heater's flow rates, flow and return water temperatures, power output, voltage etc. The heater was running as well as I have ever seen; the temperatures were showing the pipework layout Andy had used was extremely efficient at dispersing the flow around the system.

I monitored the floor temperature, fully expecting to see unacceptably high temperatures. I could not believe it, but with no control the floor was emitting an average of 32C! Just about perfect for a comfortable feel. It would appear that the size of pipe, temperature of water and thickness of floor all combined to ensure the heat dissipation was absolutely perfect!



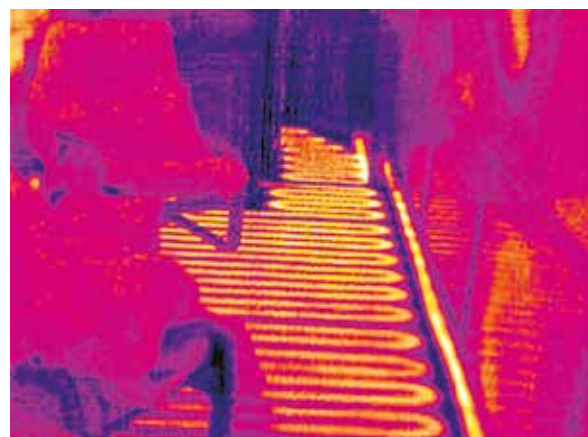
With no radiators or pipework plinths, the interior looks clean and extremely roomy. PHOTOS SUPPLIED UNLESS OTHERWISE INDICATED



The open-plan design gives the boat a nice large floor area.



Looking through to the master bedroom.



Thermal imaging shows the pipework layout.



Another thermal image.

The boat we were testing was a 58ft narrowboat and if the (external) temperature was 0C this boat would require approximately 2.5kW to equal the heat loss of the boat and 3 to 3.5kW to heat. Andy's floor was putting approximately 3.5kW into this boat. Again, perfect!

Is it worth it? Personally, I think the boat I tested had the most pleasant feeling and even heat distribution I have ever felt on a narrowboat, and trust me I have been on quite a few boats in the last 27 years! There was none of the usual 'hot head, cold feet' syndrome that can happen when convection radiators are used, or the warm and cool areas sometimes suffered because of poor radiator sizing or spacing.

Conclusion:

Andy and the team at JD Narrowboats seem to have produced a boat matched perfectly to our heater. It took the ideal amount of heat from the Eberspächer, the boat heated quickly and efficiently, it could even heat the domestic water and still maintain a good volume of water to keep the heater happy (this is normally quite tricky to do with separated underfloor systems). And all for half the price of a complex, modified household system, or so Andy told me!

I only had one small criticism, the particular boat I studied had three heating 'zones', first was the galley, then saloon and finally the bathroom/bedroom. These had to be controlled manually. Each zone could be controlled thermostatically and

I'm sure future boats could include this option at a small additional price.

One of the reasons this boat heated so well and so evenly was due to the open plan layout. A widebeam is much easier to heat because you generally have more floor area.

If a small cabin is required, a small radiator or fan matrix heater is always possible. (This can be awkward to achieve on conventional systems as two plumbing systems are required, one low temperature for the floor and one high temperature for radiators etc.)

Please don't contact JD Narrowboats asking for detailed instructions of how you can achieve the same results. They have been fitting underfloor systems for more than five years now and are basically the go-to guys if you want a boat built this way. They have put in a lot of time, effort and money into getting the flooring type and thickness right, along with the pipe sizing, spacing, flow rates, underfloor insulation etc., etc. JD Narrowboats will be exhibiting at the Crick Boat Show this year and I will be found in the Midland Chandlers tent. Please feel free to pop along and ask any questions you may have.

Peter Collard, marine heating engineer, Eberspächer UK Ltd, Climate House, Yeoman Road, Ringwood, Hampshire BH24 3FA
Contact: 01425 480151; peter.collard@eberspacher.com