



# **BARREL SAUNAS**

# Technical Datasheets

# Cedar Hot Tub Assembly

## Introduction:

Thank you for selecting a Dundalk LeisureCraft Tub! Your tub will provide many years of soaking enjoyment. Assembly will be easier if you follow the correct sequence of steps and use the proper tools. ***Please take the time to read the instructions completely and carefully before starting the assembly process.***

**How wooden tubs hold water:** *The tub is assembled dry. Because dry wood will swell a significant amount when saturated with water, all of the joints compress tightly, allowing the tub to hold water.*

**Special note:** It is important to keep the tub floor and side staves stored in a dry place until assembly time. If the tub gets wet prior to assembly, the wood may swell to a larger size making assembly much more difficult and slow the sealing of the tub.

## Section 1: Packing List

Locate the packing list from the outside of the shipping crate to identify and confirm that all items are included. A copy of the packing list is inside the packaging. See Figure 1.1 to help identify the major parts.



Figure 1.1: Benches, Joists, Staves, Floor panels

## Section 2: Tools and Supplies Needed

A few basic tools and items are needed to complete the assembly of your new tub. Gather what you will need before you start.



Figure 2.1 tools required

- ✓ A large rubber mallet
- ✓ Small tape measure
- ✓ Screw gun or cordless drill
- ✓ #2 Philips bit for screw gun or cordless drill
- ✓ Carpenters' level (2' or longer)
- ✓ 15/16" open end, socket, or crescent wrench
- ✓ Vise Grip pliers
- ✓ Caulking gun or squeeze tube of clear silicone
- ✓ Medium sized pipe wrench

## Section 3: Site Preparation

Before assembling your tub, prepare a suitable spot for it. Hot tubs will weigh from 1500 to 8000 lbs when full of water - so a stable foundation is essential. You must provide for good drainage and a solid foundation.

**Outdoor installation:** Good drainage is vital so that water from splashing, overflow, cleaning and draining operations can be carried away from the site.

There are four basic styles of foundation for your tub. You may consider a concrete pad, a gravel pad, piers made of concrete or treated wood, or a deck.

**3.1** A concrete pad forms an excellent base for your tub. A properly poured 4" reinforced pad will be stable and resistant to frost heave. Size the pad so that the sides are about as long as the diameter of the tub. Example: For a tub 6' in diameter, pour a 6' x 6' pad.

**3.2** A gravel pad can be a simple foundation for a tub in some cases. If the ground on the site is compact and stable soil, sand, gravel or rock; a layer of pea gravel (or coarse sand) on top can be used to establish a level foundation for your tub. However if the soil is unstable, soft, duffy or muskeg, a gravel pad will settle unevenly under the weight of the tub and is not a good choice. If you choose a gravel pad, make it larger than the diameter of the tub by about 3 feet. Example: For a 6' tub, make the pad 9' in diameter. The thickness can vary depending on how much gravel is needed to level the site. Typically, 2 to 4 inches is sufficient. Smooth with a rake and check with a carpenter's level.

**3.3** Another alternative is to use **adjustable concrete pier blocks** as a foundation. This type of pier block is available at most home improvement stores and allows you to adjust the level of the tub after it is in place. Piers can be set into the ground to make a solid foundation for the tub. This method involves building a small but strong wooden frame or cribbing to support your tub.

Typically four piers should be used, and the wood timbers should be 4" x 6" or bigger. The bottom of the piers must rest on stable material.

**3.4** Another option is to **install the tub on a deck**. Installation on a wooden deck can be a good choice. Be sure that your deck has been designed to support the weight of a full tub (1500 - 8000 lbs depending on the size of the tub). Have the deck inspected by a qualified architect or building engineer prior to proceeding.

*If surrounded by a deck, the deck can hide the heating system plumbing. If on top of deck, the beauty of the tub can be better appreciated.*

**NOTE:** During assembly, you will need about 3 feet of space all around the tub for the tightening process. If necessary, assemble the tub a few feet away from its final position, then lift, slide or lower it into position (with help).

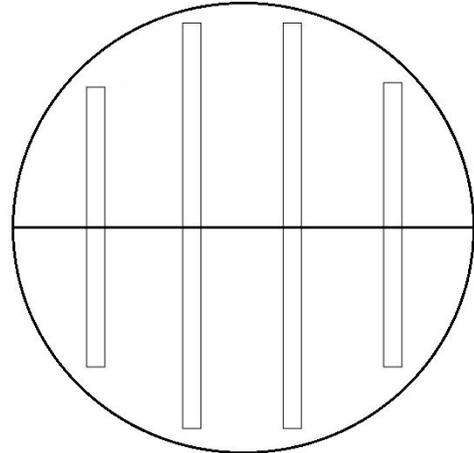
## Section 4: Tub Supports – 4x4 Joists

Time needed: Approximately 20 minutes

Important! Choose a **dry day** to assemble your Tub. The floor of your tub is supported by pressure-treated 4x4 joists (included.)

Prepare the joists by laying them out as shown.

The tub floor will sit directly on these. This allows air space under the tub and allows the drain enough clearance to pass under the staves. The weight of the tub which is supported on the timbers. The staves do not



bear the weight of the tub! Once again: **DO NOT SUPPORT THE WEIGHT OF THE TUB ON THE BOTTOM OF THE STAVES.** The flat floor of the tub should be directly on the joists.

Fig. 4.1

Use your level to get the joists level in all directions. Joists must run perpendicular (at right angle to) the floor seam. See Figure 4.1 for the proper position. Take care that they do not interfere with the preferred position of the floor drain. If necessary move the joists slightly. It is not necessary to glue or nail the joists in place.



Fig. 4.2

## Section 5: Floor and Drain Assembly

Time needed: approximately 20 minutes

Install the floor drain at this time in the recessed hole in one half of the floor. The recess is in the topside of the floor. Put a medium sized bead of silicone around the corner of the recessed hole, and a small amount on the threads of the drain (Figure 5.1.) Slip the drain in place with the rubber gasket on the top side (inside the tub) and tighten the large nut underneath hand tight. Finish with 1/2 turn with a pipe wrench - do not over tighten!



Fig. 5.1

Flip the floor section over and tighten with channel-lock pliers. Do not over-tighten.

## Section 6: Floor Assembly

Time needed: approximately 20 minutes

Attach the two halves of the floor to each other at this time. Lay the two halves upside-down on the joist. Optionally, a 1/4" bead of silicone caulking can be laid across the floor seam before the two halves are joined. Make the two edges exactly flush and insert a 2 1/2" Kreg Screw into the edges on both sides of the floor seam as shown below in Figure 6.1.



Fig. 6.1

Finish fastening the two floor halves with 2 1/2" Kreg screws into predrilled holes along both sides as shown in Fig 6.2.



Fig. 6.2

## Section 7: Staves

Time needed: approximately 45 minutes.

The staves are the vertical boards that make up the sides of the tub. Set the special stave with the holes for the heater hose at the position where the heater will be so it can be inserted there during assembly.



Fig. 7.1

Start placing the staves with the dado (groove) over the edge of the floor, as shown in Fig. 7.1.

**AS YOU PROCEED - Check the edges of each stave and remove any dirt or wood particles that could interfere with a good seal.**

The first stave should straddle the floor seam. Use your rubber mallet to ensure that all staves are tight together at the seams, but do not make them tight against the edge of the floor. Leave a space between the edge of the floor and the bottom of the dado, as shown. Use the pencil line circle on the floor as a guide.

Continue inserting staves all around, each time making sure the edges to be joined are clean and free of particles, that each new stave is tapped snug against the previous stave all along the joint, and that you continue to follow the scribe line on the floor.

Don't forget to insert the special stave with the holes for the heater hoses in line with where the heater will be

positioned. The other place that needs special attention is the opposite end of the floor seam. It must be straddled by a stave. You must avoid having the floor seam line up directly with a seam between staves. Make sure that the floor seam is no closer than about one inch to the seam between the stave that straddles it and its neighboring stave.

Insert the final stave. It will be somewhat tight. You might have to tap the surrounding few staves outward and apart slightly to make enough room to slide the final stave down into place and get its dado over the edge of the floor (Fig 7.2 - 7.4).



*Fig. 7.2*



*Fig. 7.3*



*Fig. 7.4*

## Section 8: Compression Straps

Time needed: approximately 15 minutes

Once all the staves are in place you are ready for the bottom compression strap. Locate the aluminum alloy compression straps. They supply the external force needed to bind the staves and floor together into a rigid water-tight tub.

Locate the three sets of 12"x 1/2" stainless steel threaded rods and nuts for tightening the straps. Assemble the strap, threaded rod and nuts off the tub, and slip the assembly over the top. Rotate it around the tub until the tightening hardware is where you want it to be when finished. Measure 2" from the bottom of the staves to the bottom of the strap (it is important to position the centre of the strap directly over the centre of the dado), and turn the nuts with a 3/4" wrench until the strap is just snug enough so that it will stay in place.

Assemble the other straps, and slip them into place with their tightening hardware rotated so that it is offset from



the one below as shown in Fig. 8.1. Snug them up as before just enough so that they won't slide out of position.

*Fig. 8.1 Proper placements of straps and bolts. Note how bolts straddle a seam between staves and are staggered.*

As with the bottom band, measure 2" from the edge of the staves to the edge of the band. This is not as crucial as the precise positioning of the bottom band, but for symmetry, make it the same distance from the ends of the staves.



Fig 8.2



Figure 9.1 Hitting staves directly on the strap.

## Section 9: Tightening

**Time needed: approximately 30 minutes**

This step is best done with two people, however it can be done with one. Look inside the tub and check that any gaps between staves are evenly distributed around the circumference of the tub. If necessary, use your mallet to strike the staves from the inside using a glancing blow to adjust the gaps around the perimeter of the tub to achieve even distribution.

Now you can tighten each strap a little at a time - starting with the bottom one. Tighten the staves in stages - bottom first, then upper(s); this will be repeated several times. One person will be tightening the bolt clamp as the other person uses the rubber mallet and starts on the side opposite the bolts, rapping each stave with moderate force just above the lower strap where the staves and floor join, driving them inward.

Always start opposite the bolts and do one half of the tub, then the other. Take up the slack in the bands with the bolts as you do this. The staves should be driven on slowly. The object is to set the staves evenly around the tub. Work from the opposite side toward the bolts in one direction, then from the opposite side toward the bolts in the other direction. In this way the tub is tightened evenly.

Work around the tub, hitting each stave with a firm rap right on the bottom strap. You will see each stave seat a little tighter. After one round of tightening the bottom strap, stop and take up slack in the upper strap(s). **Note: do not over tighten the upper straps; they do not require as much tension as the bottom one.**

Check the placement of the straps now before things get too tight. It is easier to move the straps now. Use a tape measure to adjust the straps so they are placed as shown in Figure 9.2. Step back and make sure that the straps look level. Adjust as needed.

Now do another round of rapping with the mallet. This time hitting each stave a little harder - a good full swing on each one as your helper tightens the bolts. Alternate tightening each strap a little bit, so that you can keep the tension on the upper straps less than the bottom one.



Fig. 9.2 Hitting straps hard all around while tightening.



Figure 9.3 Using power driver to tighten. Stop when you see noticeable deflection of the aluminum blocks. This indicates bottom strap is tight enough. Upper straps should not be as tight.

Turn your attention to the tops of the staves. They should be lined up nicely giving a smooth interior. If any need alignment, use the mallet to hit them inward or outward to bring them into adjustment. Do another revolution of hitting each stave a little harder now as the bottom strap is tightened. Don't be afraid to hit hard. Continue tightening. The tub will come together and gaps will be getting smaller.

Now do a final tightening - but don't over-do it. The bottom strap is pressing against the floor on the inside, so it will reach a point where you can tell it is tight - don't force it beyond that. Use vise grip pliers to clamp onto the aluminum block that the bolt passes through to keep it from twisting as you do the final tightening. **Stop when you see noticeable deflection of the aluminum blocks. This indicates bottom strap is tight enough.** The upper straps don't need to be as tight as the bottom. If it feels tight, it is. Do a final adjustment on the top of the staves at this time. Remember - the wood will swell to tighten all joints once water is introduced.

*TIP: If you happen to have a torque wrench – the bottom strap should be tightened to about 40 lbs of torque, the upper ones to about 25 lbs of torque.*

Next climb inside the tub and remove the temporary floor braces. With a tube of clear silicone caulk, place a very small (  $\frac{1}{4}$ " ) neat bead all around the inside corner where the floor and the staves meet. Use your finger or a rounded piece of wood like a tongue depressor to smooth the bead. Also put a very small bead on the top of the floor seam. The purpose of the silicone is to slow the initial seepage from the dry tub - allowing the wood to absorb more water and swell more quickly. Your tub will hold water as a result of the expansion of the wood, causing the joints to compress.

Your tub is now ready for installation of the heating system and any other accessories.

## Section 10: Accessories

1. Install any accessories **in this order**:
2. Heating system - see separate instructions for your type of heater
3. Benches - see below
4. Access Steps - see below
5. Cover - see below

### 10.1: Benches

The bench system is simple. They each sit on two end brackets attached to the walls, and once support in the middle attached to the floor.



Fig. 10.1.1 Rest the benches on top of the tub to attach the bench-end supports

Start the 2" screws into the brackets and attach the centre support to the bottom of the bench (Fig. 10.1.3).



Fig. 10.1.2 Attach bench brackets with supplied 2" screws.

Make sure that the bench brackets are flush with the ends, and about  $\frac{3}{4}$ " back from the front edge of the benches.



Fig. 10.1.3 Bench Brackets Flush with ends of benches,  $\frac{3}{4}$ " from wall.

By trial and error, position the three assembled benches into the tub, spacing them equally apart, until you're sure that the 2" screws will not be driven into any seams between staves as this will cause a leak.



*Fig. 10.1.4 Position the benches so that no screws will be driven into any seams between staves.*

## 10.2: Heater

Put a bead of silicone caulking under the flange of the heater hose fitting, and fasten it with three supplied mounting screws as shown.



*Fig. 10.2.1 Fasten heater hose fitting.*



*Fig. 10.2.2 Attach heater hoses with gear clamps*

Hook up the heater to the hoses and assemble the stack pipes on top. See manufacturer's instructions for more detail.



*Fig. 10.2.3 Assembling the heater stack.*

## 10.3 Steps:

If you purchased steps from us, they are intended to be placed next to the tub and are held in place with two 2" stainless screws through brackets under the top step. Drive the screws through the bracket under the top step and into the tub, avoiding cracks.



*Fig. 10.3.1 Steps, Tub, Heater*

## 10.4 Cover:

The vinyl and foam cover is the main insulation for your tub. It should provide years of good service. Avoid punctures or tears, which could allow water to get inside the cover. If you live in a high wind area, you will need to secure the cover so it doesn't blow off. This can be done by using the attached hold-down straps or by other means. To use the hold-down straps, let each hang down along the outside of the tub. Use a pencil and mark the bottom of each buckle on the side of the tub. Next separate the buckle (two parts) and screw the bottom part to the side of the tub at your mark with small (1") stainless steel screws (included).



Fig. 10.4.1 Attaching the cover strap buckle.

**Cover security:** Included with the cover is a small plastic "key" that can be used to lock the strap buckles for security. Please note that this is not intended to prevent someone from getting in the tub. To prevent children or others from getting in the tub you will need to install the tub in a secure area.



Fig. 10.4.2

## Section 11: Finishing the Exterior of the Tub and Steps.

You can choose to protect the outside of your tub from the long-term effects of sun, wind and weather, by applying teak oil or semi-transparent exterior wood stain to the outside (never the inside) and top rim of the tub. This will preserve the beauty of cedar.

## Section 12: Adding Water

If you used silicone, and it is dry (usually in about an hour), you are ready to proceed with filling the tub. Review any instructions included with the heating system that pertain to filling the tub first.

Install the plug in the drain.

You are now ready to fill your tub with water for the first time. A new tub is like a new wooden boat. It may leak until the wood swells and the tub becomes tight. Be prepared for a few leaks. These will slow and stop as the wood swells. Be sure that the area around the tub drains well.

Begin filling the tub from your water source, typically a garden hose. Start by putting about 6" of water in the tub. Stop there and let it soak for at least an hour. Observe how the tub is holding water.

If the tub is holding water well, add additional water to about the half full level. Once this is stable, fill to within 2 inches of the top.

If you have significant leaks, be very patient. Add water occasionally to slowly bring the level up, a few inches at a time. **Don't try to tighten the compression straps or hit the staves with the mallet when the tub is full of water.** Leaking will slowly stop. As soon as the tub is holding water well, turn the water off and check it every few hours adding water as needed. The swelling process continues **for at least two weeks**. It is normal for a wood tub to drip a small amount of water.

If you have a limited water supply - use a slightly different approach. Put 2 to 4 inches in the bottom of the tub to well and seal the bottom joint. After about 24 hours, slowly bring the level of water up. This way you can minimize the amount of water used to seal the tub.

Warm water accelerates the swelling of wood. If the tub is holding water well and your heater is set up, you can heat the tub. It may take a several days to swell completely.

The swelling process continues **for at least two weeks**. It is normal for a wood tub to drip a small amount of water.

Included with your tub is a bag of fine cedar sawdust. If you have a persisting leak after two weeks you can use this sawdust to seal the tub.

**Important: if you hooked up a filter, remove the cartridge from the filter during this procedure, otherwise it will clog.**

Drain the tub and spread a cup or two of fine sawdust on the floor of the tub, or alternatively, use a little water to make a peanut butter-like paste of the sawdust and smear some directly on the area that is leaking. Refill the tub. As the water is added, the wood flour will be naturally drawn to places where the water is seeping out and accelerate the swelling and sealing of the tub. The sawdust is harmless and the excess will be flushed out the first time you drain and rinse the tub. Note: It may take more than one treatment to slow or fix the leak, but this method works in almost every case.

The natural oils and tannins in cedar (especially red cedar) will cause the water to turn tea-colored when the tub is new. This is normal and harmless. The sweet aroma of cedar is due to these oils. You may want to change the water frequently at first to help clarify the water. This effect will diminish with time.

## Section 13: Tub Safety

Your tub will give many years of enjoyment. Please note the following general safety points:

1. Tub safety is your responsibility.
2. Never allow unsupervised children to use your tub. Be sure that a responsible adult is in control at all times. **IT IS YOUR RESPONSIBILITY TO PREVENT ACCIDENTAL DROWNING.**
3. Hot tubs are for sitting only. Do not allow diving or horseplay.
4. Children should use the tub at lower temperatures than adults. Consult your physician for advice on hot tubbing for children, pregnant women, people with heart conditions, or you have other specific questions concerning health and safety.
5. Consult your physician about recommendations regarding your ability to soak and at what temperature. Never soak in water warmer than 104 degrees Fahrenheit.

## Section 14: Tub Maintenance

Your tub should last for many years and require little maintenance. Here are a few recommendations.

Keep the tub filled whenever possible. Remember that a wooden tub is a dynamic object and the wood will swell and shrink with exposure to water or lack of it. Like a wooden boat, it will seep water at first, then swell shut.

Leaving the tub unused for extended periods of time. If you need to leave the tub unused while on vacation or for other reasons, drain most of the water out leaving about 3 inches in the tub. Drain the heating system including any filters or pumps in the system. Secure the cover on the tub and wrap the tub with a tarp to protect it and prevent excessive drying.

The worst thing for a wooden tub is to let it dry out. Keep the tub filled whenever possible. This keeps the wood from drying out, shrinking and opening up the seams. If you need to drain the tub in cold weather or when you are away for an extended period, leave about 3 inches of water in the bottom so the floor seam will not dry out. The tub will not be permanently damaged by drying out, but will have to swell again to hold water.

If the tub does dry out, you can check to see if the compression straps can be tightened up a bit. Tighten the bottom strap first, then the upper ones. Do not over tighten the upper straps - they do not get tightened as much as the bottom one. **NEVER** tighten the straps when the tub is full of water!

**Freezing:** Never let the tub freeze solid when full of water!!! Since water expands when frozen, this will put enormous strain on the bottom, sides, hardware and heating system. If you are going to be away during freezing weather, or you want to shut your tub down during a cold snap, follow these steps:

1. Drain the tub down to about 3 inches in the bottom. This amount of water will not cause freeze damage and will keep the floor seam tight.
2. Drain all parts of the heating system. This includes heater, pipes, and anything you might have added such as pump, filter, etc.
3. If practical, disconnect and store the heater in a warm dry place

**If your tub develops a significant leak:** Follow these steps in order. If the first one doesn't work, go on to the second, and so on.

1. If your tub develops a leak (not just a drip) that it didn't have before, something has changed. Do some investigation to discover the cause. The most common causes are the tub drying out after being empty for a period of time, or the support for the

tub has settled causing the tub to have an uneven base. Check for bench block screws that may be in seam between two staves.

2. If the tub has dried out from being left empty, check the compression straps for tightness. If the wood has dried enough to show signs of shrinkage, it is a good idea to take up the slack with the tightening bolts. **NEVER** tighten the straps when the tub is full of water! Tighten the bottom one primarily. The upper straps should not be over tightened. Do not force them. Do not attempt to hit the staves with the mallet. This could cause additional problems.
3. Check the floor of the tub with a level and inspect the foundation and chine joists under the tub. If the foundation is uneven, the tub will need to be drained and moved, and the foundation problem fixed.
4. **Wood sawdust** is one of the simplest and most effective ways to stop leaks. This is a technique borrowed from wooden boat builders. The wood dust will find its way into the leak because of the water movement, and help to stop the leak. Included with your tub was a small bag of fine wood sawdust. If you can't find it or need more, you may be able to find some locally at a woodshop or we can send some to you.

**Important: if you installed a filter, remove the filter cartridge from the filter during this procedure, otherwise it will clog.**

Drain the tub and spread a cup or two of fine wood dust on the floor of the tub, or alternatively, use a little water to make a peanut butter-like paste of the wood dust and smear some directly on the area that is leaking. Refill the tub. As the water is added, the wood sawdust will be naturally drawn to places where the water is keeping out and accelerate the swelling and sealing of the tub. The dust is harmless and the excess will be flushed out the first time you drain and rinse the tub. Note: It may take more than one treatment to slow or fix the leak, but this method works in almost every case.

5. If the above solutions have not worked, apply a small amount of silicone to the leaking area on the inside of the tub. The surface of the wood must be completely dry for the silicone to adhere.

## Section 15: Warranty Information

Your tub has a limited warranty for two years against defects in material and workmanship. This warranty excludes damage caused by errors in assembly, normal wear and tear, and modifications made to the tub.

The cover has a manufacturers' limited warranty of four years.

Heating and pump equipment has a limited warranty of one year.