Care & Maintenance

Very few people understand the care required by a high-end instrument. A category which all Larrivee Guitars fall into. The way you care for your instrument dramatically affects its appearance, sound, and length of its life. With proper care, a new guitar will last for more than a century.

A solid wood acoustic guitar is built with thin pieces of wood. Some under 1/8th of an inch thick. Because the wood is so thin, it has a great deal of surface area, and therefore it both gains and loses moisture very quickly.

When wood loses moisture - it shrinks.
When wood gains moisture - it expands.

This expansion and contraction in relation to relative humidity are at the root of the majority of problems you will see in an acoustic guitar. The average guitar is built between 40-45% humidity, relative to 72 degrees Fahrenheit (22 Celsius), better known as room temperature.

Relative Humidity

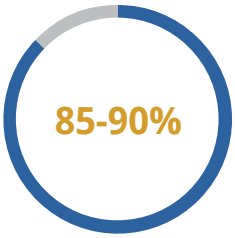
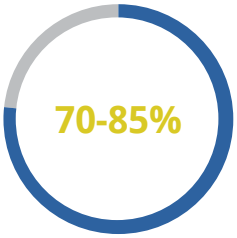
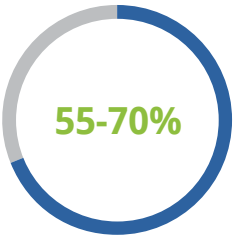
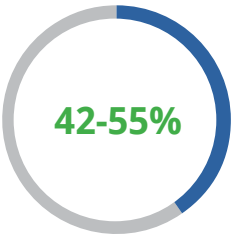
What is Relative Humidity, and why is it not just called humidity? Here is a basic summary of this scientific, technical term: The amount of moisture that air can hold changes based on temperature. The warmer the air gets, the more moisture it can hold.

This means that 50% humidity at 90 degrees is different from 50% humidity at 20 degrees. Since the humidity level is relative to temperature, the humidity at a given temperature is expressed as “Relative Humidity.” In this document, when we talk about relative humidity, we will presume a temperature of 72 degrees.

The safe Relative Humidity levels for a solid wood acoustic guitar can range from about 0-5% below to 10-15% above the relative humidity under which it was built. Once the guitar is brought outside of this range, the guitar begins expanding or contracting. Dehydration accounts for about 90% of climate-based repairs.

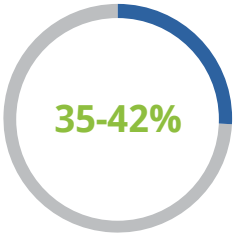
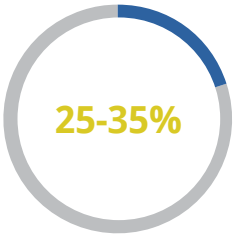
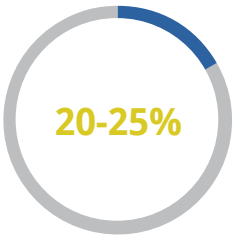
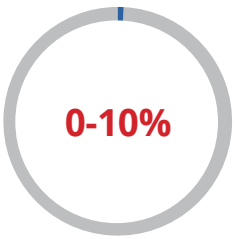
Humidity Range Guide

Use the following guide to see the healthy zone and damage that can occur outside of the normal humidity range.

RELATIVE HUMIDITY	1-3 Days Exposure	3+ Days Exposure
 90-100%	Guitar body will appear swollen, and sound quality will be diminished, playability will decrease. Back braces may come unglued as the wood expands. Action will get very high quickly.	All Glue Joints will loosen, Top and Back braces will loosen. The bridge may shear come off the top, the guitar top will expand and belly (become convex) both in front of and behind the bridge, if the glue joints do not delaminate then the guitar will be unplayable. Fretboard from the 14th on will appear raised. Mildew may form inside the guitar. Guitar will very likely de-construct itself.
 85-90%	Guitar body may appear swollen, sound quality will slightly diminish, playability may decrease. Action will become higher.	Braces will come loose after a few weeks, top and back will appear very bellied (convex), bridge may loosen or come off, playability will be affected. Fretboard from the 14th on will appear raised. Mildew may form inside the guitar.
 70-85%	Sound quality may be diminished. Soundboard may appear swollen. Action may be slightly high.	Top and back will appear bellied (convex), playability will be affected. Fretboard from the 14th on may appear raised. Guitar will start to have a musty smell after a couple of months.
 55-70%	No major problems should occur with limited exposure.	Top and back will appear bellied (convex), playability will be affected. Fretboard from the 14th on may appear raised. Guitar will start to have a musty smell after a couple of months.
 42-55%	No problem will occur in this range.	No problem will occur in this range.

Continued...

Humidity Range Guide

RELATIVE HUMIDITY	1-3 Days Exposure	3+ Days Exposure
	No major problems should occur with limited exposure.	Fret ends may feel sharp, soundboard may appear slightly collapsed (concave), action may lower slightly, bridge wings will appear concave, the guitar may develop a buzz.
	Fret ends may start to feel sharp, top may become slightly collapsed (concave).	Fret Ends will feel sharp, Soundboard and back will become flat or collapsed (concave), action will feel lower, guitar will likely buzz, Bridge wings will appear concave, after several months the bridge may “lift” or shear off.
	Frets will feel sharp, top may begin to collapse (concave), Action will lower very quickly, guitar may develop a buzz.	Fret Ends will likely feel very sharp. Soundboard and back will become flat or collapsed (concave). The last six frets of the fingerboard will likely sink into sound hole. The action will lower, and the guitar will buzz. The bridge wings will appear concave, cracks in the soundboard may develop, especially from the bridge to the butt of the instrument, the bridge may shear off (come unglued).
	Frets will likely feel sharp, top & back will likely become collapsed (concave). Action will lower very quickly. The guitar will likely develop a buzz. Soundboard may develop a crack running from the bridge to the butt, and bridge may come unglued.	Fret Ends will feel very sharp. Soundboard and back will be collapsed (concave). The last six frets of the fingerboard will sink into soundhole, action will be lower, and guitar will buzz, Bridge wings will appear concave, a large crack in the soundboard will likely develop from the bridge to the butt of the instrument, and the bridge may come unglued. Rosette rings and tail wedge may be visibly raised.
	Frets will feel sharp. Top & back will become collapsed (concave). Action will lower very quickly, and guitar will develop a buzz. Soundboard may develop cracks, especially running from the bridge to the butt. Bridge may shear off.	Fret Ends will feel very sharp. Soundboard & back will become collapsed (concave). Last six frets of the fingerboard will sink into soundhole. The action will be extremely low with buzzes up and down the fingerboard. The Bridge wings will appear concave, cracks will develop in the soundboard, especially from the bridge to the butt of the instrument, and the bridge will shear off. Rosette rings and tail wedge will appear raised. Braces that do not shear off may push out the binding of the instrument Braces will be visible as high spots on the top and back.

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As you can see, a great deal of damage can occur to an instrument when it is brought outside of a healthy relative humidity range. It is essential to take proper care of your instrument, following the guidelines in the following sections.

Many people believe if a guitar is worth thousands of dollars that it should not be affected by the problems associated with fluctuations in relative humidity. The truth is that high-end guitars, in general, are more sensitive to humidity change than others. A high-end guitar is constructed using thinner woods and thinner finishes, which are more susceptible to climate change than guitars constructed of plys, laminates, or layered woods.

Summer Care

Although the woods we use in your guitar's construction are stable and aged three to five years, after assembling, the glued joints of lining, purfling, etc., can take up to a year to stabilize. With the introduction of excess moisture (in the form of high summertime humidity), the guitar will expand (and distort) unless properly cared for. Damage to the instrument may result.

When the relative humidity exceeds 60%, the guitar will begin to expand. Following are a few symptoms of this expansion which you would observe:

1) The easiest symptom to spot is the bellying of a guitar top. Most commonly, the top will begin to raise (or swell), which appears as a distortion of the surface of the top. This is especially noticeable in the cutaway models. The guitar back will also rise, swell, and distort under these conditions. This is evident by a depression in the back, at the front, and tail blocks. The higher the relative humidity, the more noticeable the distortion becomes. You can check by removing your strings and placing a straightedge across the top between the soundhole and the bridge. Running it from the bass to the treble side. Under normal circumstances, the top should be flat or just slightly convex. About 1/32" or 1mm gap on either edge of the ruler. Any more and the guitar is considered bellied.

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2) Another visible change with the introduction of excess moisture is that all glued joints, e.g., the back, top, and side joints, will appear much more noticeable. This is especially evident around the inlays. The pearl is impervious to changes in humidity, but the wood surrounding the pearl is porous and swells under conditions of high relative humidity. As the wood swells, you will detect a line surrounding the inlay where the moisture enters the wood.

3) A rise in the height of the action is one of several significant problems to be observed in guitars exposed to excessive relative humidity. The more moisture, the more pronounced the height of the action becomes. This problem is more evident in very moist climates like Hawaii, Florida, or Japan. Several forces cause a rise in action. The excess moisture causes the top of the guitar to swell and "belly" outwards, pushing the bridge and the strings upwards. The back of the guitar also expands. As the back does so, it pushes the neck upwards. This has the effect of making the area between the nut and saddle somewhat concave.

4) The problem is then further intensified by the expansion of the ebony fingerboard, which causes the frets to loosen. Frets, when fitted, are tight and also serve the function of keeping the neck back. When they loosen due to expansion of the fretboard, the neck will also bow upwards, causing the action to increase further.

Keep in mind that the gloss or satin finish will not stop moisture from entering, though it may slow it down for three or four days. With prolonged exposure to higher relative humidity, the finish will begin to distort. The distorted finish on the top appears as small ridges, having a slight corrugated appearance. On the back and sides of your guitar, it will appear as though the pores are sinking. As the rosewood expands, the pores also enlarge, causing the finish (which is impervious to humidity) to sink deeper into the pores. Just like the back & sides, finish on a mahogany neck will also sink into the pores for the same reason.

Another effect of high relative humidity on the guitar is the loss of sound quality as the instrument distorts, long with a definite decrease in string life. Fortunately, all of the above problems associated with exposure to high relative humidity should correct themselves when the instrument returns to the normal range of humidity: 40% to 50% relative to 22°C or 72°F.

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There are more serious effects of prolonged exposure to high humidity, including the loosening of the braces, stretch marks in the finish, action which remains high, and a general loss of appeal in the guitar. While a qualified repair person can handle these issues, they may leave lasting effects on the guitar.

Please note that damage of this kind is not covered under warranty.

Now here is the good news. Most of the problems related to excess humidity are avoidable with some simple precautions.

1) Do not over humidify your guitar by excessive use of homemade or low quality, in the case humidifiers. They can be dangerous and use only quality and reputable products.

2) Never keep your guitar in a dark cool basement during periods of high humidity. This environment can accumulate moisture in the tight quarters of the case and can eventually lead to mold growth inside the guitar as well.

3) If the humidity in your home is consistently 70% or higher, then consider keeping your guitar in a room that is controlled by a quality dehumidifier. This will also require monitoring with a quality hydrometer.

Another factor that can adversely affect your instrument in the summertime is high temperature. When the weather is warm, never leave your guitar in the trunk or back of your car. In such locations, the build-up of heat can exceed 66°C or 150°F. Temperatures this high can have a devastating effect on your guitar, as the heat can cause the glue joints to melt. A guitar is built using standard carpenter's glue. High heat will break down this glue, and your guitar can come apart on itself. Please note that this problem will not correct itself when the temperature drops to normal. This case would require significant repair work which would not be covered by your warranty.

Spruce tops contain small resin pockets not always visible under normal conditions. This is especially true of tight-grained spruce and is more common to German Spruce than to domestic spruce. When the environmental temperature increases dramatically, it causes these resins to expand and to try to escape. Of course, the only way out is through the finish causing blemishes all over the top. Although this looks disastrous, it is not particularly hard to repair. A competent repair person can correct this problem with a light sanding and polishing of the by

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exposure of the instrument to excessive heat.

One more problem worth mentioning here regarding summer is that exposing a guitar to bright sunlight for a period of time, premature yellowing of the top will occur. Imagine getting a tan. This yellowing is not an issue, but if there is some obstruction to the light, such as a guitar strap laying across the face of the guitar, it will leave a tan line. There will be a lighter print in the shape of the obstruction, which would be quite a defacement. Keep this in mind when you put your guitar down during the summer months.

To lengthen the life of your guitar strings, wipe the strings down with a soft cloth after you play. When changing strings, it is a good idea in both summer and winter to go over the fretboard with 000 Steel Wood (make sure you take care not to scratch the finish on top), removing all build-up of oils, dirt, dust, and grime. The steel wool will also serve the function of slightly polishing the frets and fingerboard, which makes them more slippery and results in an overall improvement in playability.

Winter

Winter is when your guitar can be in real peril. The danger in winter is excessively low relative humidity, i.e., lower than 40% relative to 22°C or 72°F. Exposure at any rate lower than 40% for any period of time will result in damage. Damage caused by dryness is much more severe than the damage associated with excess humidity, and usually requires the prompt attention of a competent repair person.

Use a hygrometer, either in the case or in the room, your guitar is stored in. This will give a rough estimate of the humidity, though hydrometers are notoriously inaccurate. So do your research and make sure you are purchasing a quality hydrometer. It would be best if you always watched your instrument, it will tell you when it is dehydrated.

You can examine your own guitar for the following symptoms to determine if your guitar is dry.

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1) Sharp Fret Ends – Sharp fret ends are perhaps the first symptom that your guitar is drying out. The ebony on your fretboard shrinks, but the metal fret wire does not. This causes the frets to protrude from the edge of the fingerboard. You'll notice this while playing your guitar, as the frets feel sharp. Some shrinkage of the fingerboard is normal over the life of the guitar and is not a sign to panic. However, if you notice it, then you should examine the guitar for additional dehydration symptoms.

2) Collapsed Top – When a guitar dries out, the normally convex top will collapse and become concave. You can spot this quite easily by either sighting across your soundboard (between the soundhole and bridge) or by laying a straight edge across this area. Under normal circumstances, the top should be flat or just slightly convex (about 1/32" or 1mm gap on either edge of the ruler). If your straight-edge sits flat on the soundboard or if there is a hollow, then your soundboard is considered collapsed.

Note the gap under the straight edge showing the collapsed soundboard.

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3) Concave Bridge Wings – If you sight across the soundboard of your instrument from the bass side to the treble side, you might notice that the bridge wings appear cupped or concave. If you see this, it is a sign that the guitar has dried out at some point. This symptom usually does not go away with rehydration.

4) Sudden lower action / new buzz & Bad Neck Angles – As the guitar dries out, the soundboard and back collapse, causing the bridge to lower and the neck to pull backward. When this happens, the strings come closer to the fingerboard. This has the effect of lowering your action and likely creating a buzz. If a buzz has suddenly developed, then check for other dehydration symptoms. Believe it or not, many people who think they have bad neck angles are just in need of some proper humidification.

This is a shot of the back of the guitar, with a straightedge laying across the waist. This should normally be bellied or convex, but this guitar is so dry, it has become concave.

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5) Corrugated soundboard – Normally, the finish of your instrument will appear flat. When the guitar dries out, the softwood area between the grain lines on your soundboard shrinks. This creates a corrugated look to your soundboard.

Corrugation and distortion in the soundboard of a dehydrated guitar.

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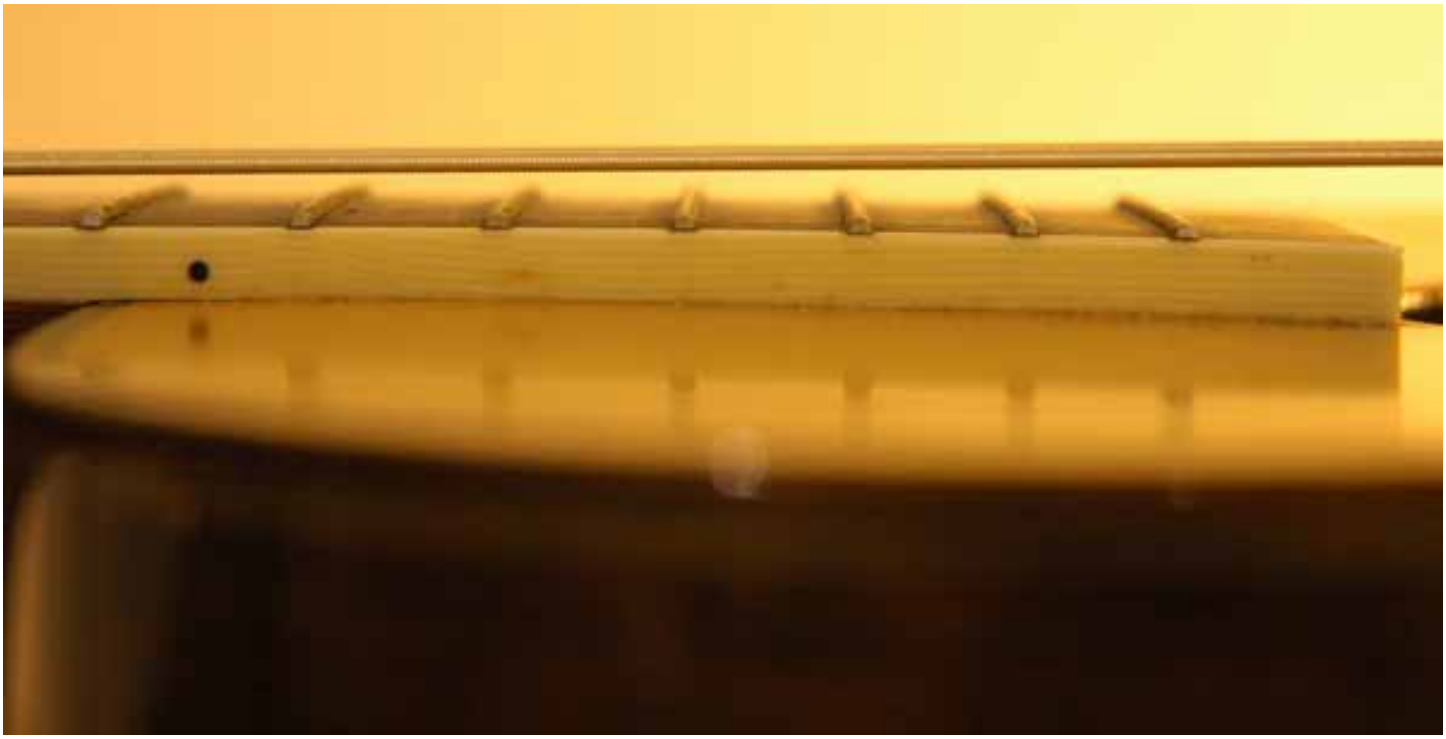
6) Fretboard sinkage into soundhole: When the top collapses, the end of the fretboard drops down into the soundhole. This has the effect of creating a hump at the 14th fret and create a nasty buzz. The picture below shows an example of this problem.

See how the end of the fretboard is sinking into the soundhole? See the gap under the fingerboard by the side dot? All caused by very low humidity.



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7) Cracked soundboard or back – This is a clear sign that the guitar has dried out. When the tension in the top (created by shrinkage) has built up, it eventually releases - and it releases in the form of a crack. Nine times out of ten, the first crack will appear under the bridge, running from the bridge to the butt, usually on or close to the center seam, and often appear within the center six inches of the top.

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The extremely low temperatures of winter in some climates are a significant danger to your guitar. Exposure to extreme cold is dangerous to the finish of your guitar, and checking (small cracks in the varnish) is common when temperatures regularly drop below the freezing point. While finish used on Larrivée guitars today is much more resilient to this problem than traditional lacquers, avoiding cold weather is advised. The most common cracks occur when you have your guitar in below-freezing weather, then expose it to a warm environment immediately without leaving it in its case and allowing it to acclimatize first slowly. Conversely, taking your guitar from a warm home out into an extremely low temperature may cause problems as well.

The solution to this problem is prevention. Allow your guitar to cool or warm up gradually, with the case closed for at least one hour. If possible, try not to take your guitar out in extremely frigid temperatures.

If, despite your best efforts, the finish on your guitar has checked, take heart. Although the checking is permanent, it will not affect the life of the guitar, its playability, or sound. It affects only the appearance.

To correct varnish checking would require a costly refinishing job, which is not covered by your limited lifetime warranty, and could affect the original tone of the instrument. Our recommendation would be to live with the checks.

Another wintertime problem concerning low humidity is the lifting of the bridge. Once more, the underlying cause is shrinkage of the soundboard. The bridge's grain runs perpendicular to the grain of the soundboard and does not shrink in the same direction as the top, therefore separating from the top with a shearing action. A qualified tech can easily repair this. Believe it or not, the lifting of the bridge is not as bad as it sounds as it often prevents the cracking of the soundboard (a more damaging issue).

The same type of tension can occur as the woods of the back and soundboard shrink against the struts, and a shearing action may cause them to separate. The result is internal buzzing and a structural weakening of the guitar. Repairing this issue can become quite costly and is not recovered by warranty.

To avoid most of these winter problems requires only the use of a little common sense. Follow some of these simple steps to keep your guitar safe:

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1) Invest in a hygrometer – Do your research and invest in a quality product. It will help you keep tabs on the humidity level in your guitar storage area.

2) Invest in a room Humidifier – We believe that it's not only best to humidify the guitar, but the room it is kept in as well. Many people use only small Soundhole humidifiers, and while these units, when used properly, can work, they contain only a tiny amount of water that can evaporate within the first eight hours. These units should be checked and filled accordingly every day in areas of extreme cold and low humidity. It is straightforward to set-and-forget a room humidifier, and you can quickly tell when it is low on water as most have clear reservoirs. Do not over humidify using this method either. Use a quality product. Contact Larrivée's support for advice.

3) Radiant Floor Heating – is VERY bad. If you have radiant heating (hot water which runs under flooring) keep your guitar off the ground. The built-up heat can destroy your guitar in a short amount of time.

4) Keep your guitar Cased – Never Leave your guitar hanging on the wall in winter. The heat from your furnace rises, and the temperature at floor level may be 18°C, while five feet off the floor may be 22°C, and eight feet off the floor 27°C. At that extreme temperature, the relative humidity becomes extremely low.

If you have concerns about humidity, or you don't quite understand the information here, feel free to contact customer support, and we can help walk you through the basics.

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