Care & Feeding

Temperature and Humidity

The most important factor in protecting a solid wood acoustic guitar is to understand the effect of temperature and humidity on it. The best way for you to be able to protect your guitar from damage is to understand what factors affect it and how best to control these factors.

Many of us who grew up in dry, cold climates believed that dry, cracking lips in the winter were just a part of life. Later, as I began working with wood and instruments, I discovered that when I took the precautions necessary to stabilize the woods I was working with, my skin was healthier too. In general, the conditions which humans find most comfortable are the best for a solid wood instrument. Having realized this then, instead of defining a humidification regiment that could never properly address all situations, we recommend that you buy a digital hygrometer and sensitize yourself to the conditions required to protect your acoustic guitar. Once you have purchased a hygrometer it is imperative to understand what you are measuring.

A hygrometer measures the amount of Relative Humidity, or RH, in the air. RH is the amount of moisture in the air relative to the amount of moisture the air can hold before it reaches the saturation point. As the temperature of the air rises, so does its ability to hold additional water.

In the winter when people are artificially heating their homes and studios, three things happen:

1. As the temperature increases without an additional source of moisture in the house the RH drops.

2. The air you are starting with before you heat it is very cold, meaning that it is carrying very little moisture even when the RH is very high, such as in a snowstorm. Because cold air has a very low saturation level, it will carry very little moisture. Even if the RH is high when it is cold, by the time that air is warmed up to 75 degrees, the RH will be extremely low. The saturation point of air at higher temperatures is so much higher, that the RH will be very low, unless significant moisture is added to that air.

3. The actual mechanics of heating, especially when using wood or electric methods of heating further dries out the air. The result is that if you live in a dry area such as the notorious Rocky Mountains, or in any area when it gets very cold, you will have to be careful to protect your guitar from low humidity damage.
Dealing with Low Humidity Conditions

Our repair facility is in Montana. In order for us to maintain 47% humidity when the mercury drops below 0 degrees, we have to add 10 gallons of water per day into a shop of only 900 square feet. The exact amount varies with the temperature but you can imagine the magnitude of the problem by this simple fact.

If you generally keep your guitar inside your house and prefer to keep it out of the case, you should have a room humidified to 47%, and a hygrometer monitoring the RH of the room. Many reasonable room humidifiers are available from between $50 to $200 and remember, it will make you and your family more comfortable too.

If you don't have a humidified room, or are traveling or gigging a lot, you will need to humidify and monitor the RH of the guitar in the case. The case insulates a guitar from rapid changes in humidity and temperature and from physical damage anyway, so even in a humidified room, it is best to have the guitar in the case whenever possible.

Install the hygrometer on the body side of the outside of the accessory compartment of your case. Then humidify by placing the humidifier in the accessory compartment. This way the hygrometer will only read what moisture is available to the instrument not what is coming out of the humidifier. There are many good brands available, but keep in mind we don't recommend putting any of them in the guitar. Put the humidifiers in the accessory compartment and use 2, if necessary, to get the reading up on the hygrometer, which will be right next to the heel of the neck on the guitar. This way there can be no chance of leaking which will destroy the instrument. If you can’t get the reading up, having the humidifiers in the accessory compartment, try putting one in under the headstock as well.

One final point. If you live in a hot but dry area, you might consider using a swamp cooler instead of air-conditioning. The result will be that you will be adding humidity to your environment.

Low Humidity, below about 40%, can cause cracking in both the wood and lacquer. The top will drop, lowering action to the degree that the strings will buzz, sometimes to the degree that it becomes unplayable. Lacquer checks will develop along the purflings, bindings, and at glue seams. The fingerboard will shrink, leaving the fret ends protruding beyond the edge of the binding. This makes the instrument uncomfortable to play. Usually the first symptom to develop will be a slight dropping of the top and lower action, followed by the possibility that a hairline crack may develop along the bridge pin holes. This is an excellent early warning symptom. It is easy to fix and it lets you know that you are headed for trouble if the humidity problems continue.
High Humidity Conditions

If your problem is high humidity, it will be harder to deal with, but it is also a safer condition. Air conditioning will really help you keep the humidity at a reasonable level. As the temperature lowers, so does the saturation point of the air, water will condense, and the RH will decrease. Do not use a swamp cooler in an already hot, humid area, as it will almost certainly spell out problems for your guitar by causing high humidity conditions.

High humidity, 65% and above, causes the top to rise, making action high or unplayable. It can cause lacquer to check, impressions of the braces may appear on the top and puckers may appear where the top is glued to the internal structure of the guitar, such as at bridges, braces, head blocks, and tail blocks. It also restricts movement of the top resulting in a guitar that may sound tight or restricted.

Avoid Rapid Changes

Rapidly changing humidity is the most damaging condition you can expose your guitar to. Having a guitar go from an environment of 85% humidity to 35% immediately could easily cause severe damage to an instrument. If the same instrument were kept in its case, moved into a drier but humidified environment of say 65% for 2 weeks then 45% for a few weeks and finally 35%, any damage sustained would likely be far less severe. Your guitar’s case is your best tool for insulating your guitar from extreme conditions and rapid changes in conditions. Keep it in its case whenever possible.

Stabilization

The most critical time for an acoustic guitar in terms of humidity is the first 3-5 years. If it has been well controlled and stabilized during that time then it is far less likely to ever have problems. This is why most vintage instruments are less likely to respond to humidity changes than a new guitar would be.

At SCGC we go to great lengths to assure that we are building with completely dry tonewoods. We run our tonewoods through a specially designed dehumidification kiln. By slowly increasing temperature in small increments while blowing air dehumidified to 40% RH over the wood, we are able to dry the wood gently over a 2-3 week period. During this process the top wood can shrink as much as 3/8” or more. This gives you an idea of how much wood moves as it responds to humidity changes. With the bound moisture gone, the wood stabilizes a great deal and the problems associated with humidity changes are minimized. This does not mean that the guitar will not move or respond to humidity, but it does mean that you have the best chance possible of keeping your guitar safe by understanding and responding to the factors affecting it.
Restoring Moisture

Once a guitar has been dried out, the humidity needs to be restored. To do this often humidifiers must be put into the guitar such as a Dampit and the soundhole sealed off. Be very careful in doing this. All of the excess moisture must be wrung out and the guitar should be put in the case for about 3 days and then rechecked. It will help to also have a humidifier under the headstock to make moisture available to the bridge and fingerboard. They should also be oiled. Expect this to take about 2 weeks before the action is restored and the guitar can be assumed to be re-humidified.

You may find that not all of the symptoms are completely resolved. Some problems such as sharp fret ends, may need further professional attention, but this is a relatively inexpensive procedure that can be done by any competent repairman. In the case that you are unable to properly restore the humidity, please call us and we can talk you through the procedure or help you to resolve the problem. In extreme cases we can authorize you to send us the guitar.

Temperature Damage

High temperatures, generally above 100 degrees, cause glue joint failure and softening of the lacquer, making it susceptible to damage.

Low temperatures, generally below freezing, cause lacquer to craze and check. One very important point to remember, rapid changes cause far worse damage than the exposure to extremes if the changes take place slowly, with the instrument having plenty of time to acclimate. When, for instance, an instrument has been transported or shipped in the winter, it may well have been exposed to extreme cold. It is best to wait overnight before opening the box. I have seen guitars arrive at a destination, get checked for damage, find none, and then the next day found the lacquer checked and crazed. In these cases the guitar was very cold to the touch when examined. This wouldn't have happened if the instrument hadn't been subjected to thermal shock. If it had been left insulated in its case and the box for at least 12 hours, it could have been opened without damage resulting.