

## Προστασία κιθάρας από υγρασία-θερμοκρασίες

### Humidity

#### Protecting Your Guitar from High Relative Humidity

It is extremely important to keep your guitar stored only in environments with measurable humidity of 60% or less, consistent with the conditions in which they are built. When relative humidity exceeds 60%, the wood may begin to expand. The most common symptoms of this phenomenon are as follows:

**Top swells:** With high humidity, the top will begin to swell, which appears as a distortion or "rippling" in the finish, visible on the top and/or back of the instrument. This is especially noticeable on cutaway models. A rise in the string action usually follows, which can adversely affect playability.

**Top bellying:** Excess humidity can cause the top of the guitar to "belly", consequently pushing the bridge and strings upwards relative to the neck. As the back expands the neck is pushed upwards. This problem may be further intensified by expansion of the ebony fretboard, which can cause frets to loosen. Frets are tight when fitted, which serves the function of keeping the neck flat. If they become loose, gaps in the slots allow the neck to bow upwards from the middle, causing the string height to increase to an even greater degree.

**Glued joints:** Excess humidity can cause all glued joints to become much more visible. In addition, pearl is impervious to changes in humidity, but the wood in which the pearl is inlaid is not and will swell with the introduction of high relative humidity. As the wood continues to swell a line (or gap) surrounding the inlay may appear.

**Distortions in finish:** Finish will not stop moisture from entering the wood (although it may slow it down). With longer exposure to higher relative humidity, the finish may become distorted. Small ridges may appear on the top, and the back and sides will appear "porous". As the wood expands these pores enlarge allowing the finish to sink deeper into the wood.

**Sound quality:** Tone quality tends to diminish as the instrument undergoes structural distortion from excess humidity, coupled with a decrease in string life and a general loss of appeal for the guitar.

Most problems associated with limited exposure to high relative humidity should correct themselves when the instrument returns to a normal range of humidity: 40% to 50% relative to 24°C.

The above problems can be avoided by taking a few simple precautions:

Recognize the symptoms described above, and if encountered, ensure that the guitar is moved to a safer storage environment.

Never keep your guitar in a dark cool basement during periods of high humidity. Excessive moisture will accumulate inside the case.

Keep your guitar on a stand as it allows air to circulate around it. If possible, it is a good idea to keep your guitar on the second or third level of your house when weather is warm.

### **Protecting Your Guitar from Excessively Low Relative Humidity**

The most common problems with acoustic guitars are caused by low relative humidity. Exposures at any rates lower than 37%, relative to 24°C for any period of time will very likely result in damage. Damage caused by dryness usually requires the prompt attention of a competent repairperson and can be much more serious than damage caused by excess humidity. If you live in an area that tends to have harsh winter weather, make sure to note the following potential problem areas:

**Low action:** One of the most common winter weather problems is string buzz resulting from low action. As the neck and fingerboard shrink due to loss of moisture from the wood, the frets (being impervious to humidity changes) force the neck back. As the top flattens out, the string height lowers and buzzing may occur up and down the fingerboard. This buzzing is usually a warning that you should humidify your instrument. In extreme cases, cracks in the top along the sides of the fingerboard extension may appear.

**Exposed frets:** If the fingerboard continues to shrink due to dryness, frets will protrude from the sides and may even catch on clothing or cut your hand. While a repairperson can file off the excess, you should take action and humidify your guitar before other more costly problems develop. The use of any kind of oil, silicone, or wax products on the fingerboard is not recommended. With constant playing, oils from your fingers should be more than sufficient to keep the fingerboard from cracking.

**Arch changes:** Excessive dryness will cause a change in the arc of the back and top. We build our guitars with the top and back slightly arched and as the wood becomes dry and shrinks the top and back can become flat, or concave. At this stage the finish may appear to ripple. This distortion is actually caused by the wood shrinking beneath the finish. However, returning humidity to normal levels should correct this problem.

**Distortions in finish:** If the back and top continue to shrink, you may also observe the center seam slightly open. Although this is not in itself serious, it can leave permanent marks in the finish. You may also notice a gap appear around the purfling and rosette. As the wood shrinks, it draws away from the more impervious materials causing a slight separation. This gap unfortunately will not disappear when the humidity returns to normal, but this will not affect the life or playability of your guitar.

**Bridge lifting:** Excessive low humidity in winter can also cause the bridge to lift. The grain in the bridge runs perpendicular to the grain in the top. Because they are made from different

species, these parts will expand and contract at different rates, and as they shrink from loss of moisture due to excessive low humidity, the bridge will actually separate from the top with a shearing action. This is quite easily repaired by a competent repairperson, but is not covered by warranty.

**Back and top separation:** The same tension as occurs with bridge lifting can occur as the back and top shrink against the struts in opposing directions, causing them to separate. This may result in a buzzing noise from within the acoustic chambers of the instrument, as well as a structural weakening of the guitar. The back is more likely to suffer from this problem, as glue does not adhere to rosewood quite as strongly as it does to spruce. Repairs of this sort can become quite costly and are not covered by your warranty.

**Body cracks:** A more serious problem associated with excessive dryness, is that the top, back and sides are likely to crack as the relative humidity dips below about 35%. To repair these cracks and subsequent damage to the finish, a repairperson must re-humidify the instrument, glue the cracks, and re-spray the top. This is a time consuming and costly repair not covered by your warranty.

A good Hygrometer (A device used to measure the moisture content in the air) and Thermometer (A device used to measure temperature) are good investments for monitoring relative humidity. Placing them near your guitar or in your case will give a good indication as to the relative humidity surrounding your guitar. In addition to using these device, make sure to visually inspect your instrument on a regular basis to check for the above types of damage. Should you encounter them, it is highly recommended that you take the guitar in for repair and identify an alternative location in your home for storing the guitar.

A note on Hygrometers: Analogue Hygrometers are notorious for being inaccurate, if at all possible it is recommended that you use a digital hygrometer (which often has a thermometer built in. Though you can buy a simple hygrometer from most hardware stores, but the one we recommend can be bought from Stewart Macdonald Guitar Shop Supply and costs about \$40 US Dollars. You can purchase it online at <http://www.stewmac.com>. The part number is 4780. Most problems associated low relative humidity will not correct themselves when the instrument returns to a normal range of humidity. If these problems occur it is important that you take your guitar immediately to competent repair person to avoid further damage.

The above problems can be avoided by taking a few simple precautions:

Recognize the symptoms described above, and if encountered, ensure that the guitar is moved to a safer storage environment.

Never leave your guitar hanging on the wall in winter, as heat will rise. While floor temperatures may be 18°C, five feet above the floor it may be 22°C, and at eight feet 27°C! At these temperatures, the relative humidity tends to become relatively low, giving rise to the problems associated with excessive winter weather

The humidity in your home during winter should be kept at approximately 45% relative to 22°C for the safety of your guitar. If it dips too much lower, problems may arise. Try to keep your guitar in a cooler place and in the case when possible. Use a Dampit<sup>®</sup> or a similar device that retains water, but make sure to check it frequently, as these units contain only a small amount of water and can completely dry out within the first eight hours.

## **Protecting your Guitar From Unusually High Temperatures**

Unusually hot climatic conditions can pose dangers to your guitar, but is mainly detrimental to the finish. If humidity is involved however, it can cause the glue used in your guitar to lose its binding properties and cause pieces of the instrument to loosen. If the guitar itself hits the 35°C mark, the natural moisture in the wood, will cause the glue to loosen. Although extremely rare, you can prevent against high temperature quite easily. The following are precautions against, and symptoms of, exposure to heat:

**Storage in cars:** Exposure to high temperatures can adversely affect your instrument. 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. Temperatures this high can be devastating, causing glue joints to loosen substantially. With the loosening of the fretboard under these conditions, the action will become very high. It is important to note that this problem will not correct itself when the temperature drops back to normal and could constitute a major repair not covered by your warranty.

**Heat and guitar finish:** Spruce tops contain small resin pockets hardly visible to the eye under normal conditions. This is especially true of tight grain spruce. When ambient temperatures increase dramatically these resins expand and try to escape, and the only way out is through the finish, resulting in blemishes all over the top. Although this looks disastrous, a competent repairperson can correct this problem with a light sanding and buffing of the top.

**Yellowing:** If your guitar is exposed to bright sunlight over time, you may notice a premature yellowing of the top (much like a person getting a tan). This yellowing is not in itself a problem, but if there were some obstruction to the light, (i.e. a guitar strap lying across the face of the guitar) a permanent lighter print in the shape of the obstruction would be left. Keep this in mind when you lay your guitar down during the summer months.

The above problems can be avoided by taking a few simple precautions:

Do not store your guitar in areas that are exposed to high heat (e.g. cars in summer weather).

Do not leave your guitar exposed to direct sunlight for extended periods of time

Do not leave your guitar near a furnace vent, or laying in its case on the floor if you have radiant heating.

## Protecting Your Guitar from Unusually Low Temperatures

Unusually cold climatic conditions can pose dangers to your guitar, but is mainly detrimental to finish. "Finish checking" (small cracks in the finish) is common where temperatures drop below the freezing point. This can result from having your guitar outside in below freezing weather, then immediately upon entering a warm room, opening the case to remove your guitar (or vice versa).

If in spite of your best efforts the finish does become "checked", it is worth noting that this only affects the appearance of the guitar, and will not affect its lifespan, playability, or sound. Most people learn to live with the "checks", as correction of this problem would require a costly finishing repair not covered by your warranty. Also keep in mind, re-spraying the top can alter the tone, especially in the case of an older instrument.

The above problems can be avoided by taking a few simple precautions:

Keep your guitar in a cool place at 5°C to 10°C for an hour or so before going outside. The same rule applies when bringing your guitar in from the cold. Allow it to warm up gradually with the case closed for at least one hour. Ideally, you should try and avoid exposing your guitar to extremely frigid temperatures altogether.

Never leave your guitar hanging on the wall in winter, as heat will rise. While floor temperatures may be 18°C, five feet above the floor it may be 22°C, and at eight feet 27°C! At these temperatures, the relative humidity tends to become relatively low, giving rise to the problems associated with excessive winter weather (see section 4 below).

The humidity in your home during winter should be kept at approximately 45% relative to 22°C for the safety of your guitar. If it dips too much lower, problems may arise. Try to keep your guitar in a cooler place and in the case when possible. Use a Dampit or a similar device that retains water, but make sure to check it frequently, as these units contain only a small amount of water and can completely dry out within the first eight hours.

### Σημείωση:

Η λέξη **action**, όταν αναφέρεται σε σχέση με τις χορδές και τον λαιμό της κιθάρας, δηλώνει την απόσταση των χορδών από τον λαιμό. "Low action" ή "fast action" σημαίνει ότι η απόσταση είναι μικρή, "high action" ή "slow action" ότι η απόσταση είναι μεγάλη.