

What specific qualities do you look for when choosing a guitar?

The instrument I select must be able to respond to a wide variety of musical demands, from the contrapuntal complexities of a Bach fugue, to exotic tone contrasts in contemporary music, to the sensuality of Spanish music. When trying out a new guitar, test it in the following categories, first abstractly and then while playing different pieces:

Beauty of tone. Does the guitar speak with a voice that is yours? Can you create a melting, luscious sound? If not, this marriage won't last long. *Dynamic and timbral contrasts.* Can the sound whisper as well as wail? Is it sharp and metallic by the bridge, sweet and dolce near the top of the fretboard? *Clarity and speed of response.* Clarity is important because it is a component of projection and speed. Are notes well articulated and crystalline in fast passages, with a quick response, or is the effort dull-sounding and labored? *Sustain.* To achieve lyrical, legato playing, sustained vibration is the key. To test this, count how many seconds individual notes remain audible. From note to note (on a single string), the count should be fairly consistent and long enough to make slow melodic works truly connected and singing. *Balance.* Also necessary for lyrical playing, balance is the equality of sound from note to note and string to string. When playing notes in a chromatic sequence or in scales that change strings, the transitions should be smooth and seamless. Try playing various melodic works to see if the line is well shaped. In contrapuntal music, are the different voices clear? Chords, too, must sound well integrated. A good test is Fernando Sor's Study #9.

Resonance. I would describe resonance as the quality of richness and depth that makes one guitar sound three-dimensional, vibrant, and full-bodied, and another sound as flat as champagne tastes the morning after. *Intonation.* To check the intonation, first make sure the strings are even and of a high quality. Notes played at the 12th fret should be equal in pitch to those played as harmonics. Tune the guitar from string to string, then check using harmonics, skipping several strings. If the pitches are inconsistent, or the instrument plays in tune only in one key, put it back on the rack.

Projection. This bane of most guitars is best tested in a concert hall; first play the instrument yourself and then hear others play it. If a hall audition is not possible, a large room will give you some idea of the instrument's carrying power, especially if you can compare it to other guitars. Don't worry about projection, however, if you never intend to play outside your own four walls. *Condition.* Avoid guitars with back-bowed or overly warped necks. You can spot these problems by peering down the edge of the neck with eyes level at the bridge. Also, nasty-looking cracks that have not been properly sealed spell trouble. Personally, I wouldn't touch a new guitar that has any cracks, and I certainly would not seek out an old guitar that has more than a couple of benign cracks. Steer clear of tops that are significantly caved-in near the bridge. Otherwise you might be awakened in the middle of the night by a major explosion.

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Comfort. Finally, the instrument should feel comfortable. Remember that some problems are correctable. An uncomfortably thick neck can be shaved by a luthier, and old, worn frets can be replaced. Distances between strings can sometimes be adjusted. If the action (distance from strings to neck) is too high, lower it at the bridge and/or nut to a point just before buzzing would occur and see if it is now easy to play. (A back-bowed neck will sabotage any respectable effort.) If you raise the action, be sure the bone has enough support and does not tilt to any major degree. Don't count on changing the neck length, however. Longer neck lengths, such as in Ramírez guitars, may be fine for some people, but torture for others. Young children or adults with unusually small hands will need guitars built on a smaller scale than the norm. But don't wait too long to figure out that the instrument was really built for a Goliath—by then you may already have fallen in love with it!

Why are classical guitars offered in various scale lengths? I have seen them as low as 630 millimeters and as high as 665. What is the standard length, and how do I determine what length is right for me?

Scale lengths vary to accommodate both builder and player preferences, as well as the different sizes of players' hands. The definition of "standard" has changed considerably in the last few years. In the 1960s and '70s, 664 mm was a common string length, largely due to the influence of the Ramírez factory in Spain. Now even the Ramírez company is making shorter-scale guitars. When I got my 1988 Thomas Humphrey Millennium model, Humphrey was building most of his instruments at 660 mm, including the one I play. In 1993 he began building most of his instruments at 650, because many guitarists find the shorter length more comfortable for the left hand. The traditional belief is that only guitars with long string lengths can be loud and powerful. Humphrey and other makers disagree, and they are building shorter scales, which they claim do not sacrifice volume or timbre.

If a child is going to study classical guitar, it is important that the width, body size, and string length be comfortable. Stretches should not strain the left-hand wrist or fingers. A child must also be able to hold the instrument securely, with adequate right-hand mobility. Some years ago, Japanese luthiers created a wide range of guitar scales to accommodate children as young as three or four. This was no doubt inspired by the success of the Suzuki method for violin and cello. (My sister, in fact, was one of the early U.S. Suzuki "pioneers" and started violin at age three and a half on what was called a "one-eighth size.") When I was nine years old and about to begin guitar studies in Italy, my teacher sent me to Mario Pabé, a maker in a nearby farm village. He measured my hands and within a few weeks built me a smaller-bodied guitar with a string length of 655 mm. I used it for a couple of years before graduating to a larger instrument.

Since I have long fingers, my choice of string length as an adult is strictly a matter of preference. A guitar with a 664 mm scale length doesn't give me the flexibility of a 660

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mm, so I avoid the former. Some adults have unusually small hands and would be better off with scales below 660 mm. Others have especially thick fingers and need more space between strings than many smaller-scale models provide. Neck thickness (which can be reduced) and width, as well as body length and width, vary from model to model and also influence how comfortable the instrument feels. An excessively high action will make playing any guitar difficult, so first see that your instrument is properly set up.

If you are choosing an instrument, try out your most difficult pieces, including those with challenging stretches, on guitars with different scale lengths. Give yourself enough time on each to determine compatibility. If you are a beginner, ask your teacher for advice. And use common sense: if you have unusually small hands, don't seek out a 664 mm behemoth!

Do you prefer a guitar with a cedar or a spruce top?

I sometimes find that spruce tops are more versatile than cedar tops in their ability to perform well for all types of repertoire. The clarity and evenness they offer, for example, is essential when playing Baroque music and is often hard to come by with cedar. Cedar, on the other hand, can sometimes have an edge over spruce when it comes to a melting depth and warmth of tone for Spanish music. The ideal is to find an instrument with both of these qualities *and* a strong projection.

What do you think a performing guitarist should know about instrument care and repair?

A guitarist should know how to prevent damage from exposure to the elements and from impact and should have rudimentary skills in cleaning, repairing faulty machine heads, solving action problems at the nut and bridge, and fixing minor electronic glitches if using a built-in pickup.

Prevention is always the best medicine. In very cold or hot weather, keep the guitar in a climate-controlled area. A common mistake is to place it in the trunk of a car, which can be devastating when it means exposure to temperature extremes. When the instrument is outdoors, avoid direct contact with sunlight. You can't exactly slather it with PABA SPF 25, so rather than risk cracking (hot mountain sun can cause cracks within minutes!), stay in the shade.

When traveling in dry climates, clip one or two cello Damp-Its in the soundhole (when the guitar is in its case, you should lodge them between the first two treble strings for a sturdier hold). Squeeze and wipe the Damp-It thoroughly to ensure that it won't drip inside the guitar. Avoid moistening the area by the Damp-It's clip so as not to expose the wood to direct contact with water. Be sure to remove the Damp-It(s) while performing, because they muffle the sound and often produce buzzes.

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Basic maintenance also includes cleaning the body, neck, and fingerboard. Grime buildup on the fingerboard, for example, can slow down your left-hand shifting. Consult a guitar maker to determine the best cleaning polish to use on your guitar's finish. If playing flamenco or using a pick, protect the soundboard from dents by affixing a plastic pickguard. Since pickguards can alter the sound, I recommend cutting one or two to size and attaching them temporarily with four loops of removable tape.

Keep the guitar in a solid case, preferably one with a slightly arched top. Soft cases offer little protection from impact and place your instrument at risk. Even when you think it's safe turf at home, it's best to store the instrument in a closed case. Nocturnal wanderings, wind from open windows, and earthquakes can all wreak havoc. I once knew a performer who knocked over a vaporizer in the middle of the night. The next day while practicing, he felt water trickling down his thigh. He discovered to his horror that the vaporizer had emptied its water into the soundhole and the water had saturated the wood, loosening all the seams. The guitar was ruined.

Even if you have a good case, be on guard for faulty handles or straps. Few cases would allow your instrument to survive unscathed if they suddenly lurched from your hand or shoulder onto hard pavement. Finally, don't check your guitar in airline baggage unless you have a heavy-duty travel case and are assured it will be handled gently. If you do check it, loosen the strings to avoid strain from unpressurized cabins.

In the event of an emergency, a few repairs are feasible to do on your own. If the action has changed and is creating buzzes or uncomfortable tension, make appropriate adjustments at the bridge and/or nut. Carry extra bridges and nuts along that are slightly higher and lower than what you're using. That way, if the neck's bow changes, you can make a replacement. You can also sand down a high bridge or nut on the bottom side. Low bridges and nuts can be raised with a wood shaving (in the event that you don't have a thin sheet of wood handy, you can slice a shaving off a long wooden matchstick), provided the slot in which it fits is deep enough to hold it stable. If a single groove has worn too deeply in the nut, you can repair it temporarily by layering on Krazy Glue until the groove depth matches that of the others.

If your machine heads break, replace them by removing the strings and unscrewing the old heads. If the problem is a squeaky or stiff gear, a little oil may solve the problem. If a gear is stiff because a screw is pulling away from the neck and causing misalignment, try replacing the screw. If you still can't get traction, wedge tiny wood shavings into the hole until the screw will stay firm. This is a temporary measure until your guitar can be fixed professionally. If you use a built-in pickup, carry along extra batteries and a miniature screwdriver. It would also be wise to carry an extra pickup in case your built-in pickup stops working. Finally, I wouldn't attempt to repair cracks. That kind of work is best left to a professional.

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What can cause a rattle in a guitar?

Strings, loose joints and bracings, loose frets, dried glue, cracks, and foreign objects are some of the major potential culprits in the case of a mysterious rattle. But before pulling out mirrors and flashlights to investigate the interior of your guitar, check for more obvious problems.

First, shake the guitar vigorously. Is there a rattle inside the soundbox? Turn the guitar upside down so that the soundhole faces the floor and shake again, tipping slightly from side to side. If there is a loose object, it should eventually tumble out. When this happened to me a few years ago, I was horrified to witness the hardened corpse of a roach fly out and land on the floor. Ensnared by Vivaldi and Rodrigo, it hadn't had a meal in days and had been transformed into a pathetic percussive accoutrement.

Check the bridge area to see if any of your strings is resting on the soundboard. On a classical guitar, long string-ends left to rest on the wood will surely rattle away like a snare drum. In order to keep the ends short yet secure, you should thread the string once or twice through its loop before putting it out through the bridge hole. In the case of treble strings, tie small knots at the very ends to assure that they can never snap through the holes. (This isn't necessary with carefully affixed bass strings because their metal windings inhibit slippage.)

Check the tuning peg area to see if any string ends are rattling, either against the wood or against other strings. Play open strings with your right hand while damping suspicious targets with your left. If the rattle stops at any point, you've probably found the source. Similarly, check for loose pegs and machine heads by applying pressure to each as you play.

Check carefully for cracks throughout the instrument. If you find one, press it while playing open strings. If the rattle stops, the crack should be glued by a professional repairperson.

Play open strings and move your left hand around the soundboard, including all edges, applying pressure inch by inch. If you don't get any results, apply pressure to the area of the neck that covers the soundboard and the bridge. If that doesn't work either, try the back and sides. Then try pressing each fret. If at any point the rattle stops, the pressure point indicates the probable area of trouble—most likely a loose joint, loose glue, or an interior crack. Once you've identified the area, you can investigate further with a mirror and a flashlight, but the problem will still require professional repair.

If the rattle occurs only on specific pitches that are not open strings, you'll need an extra arm to help. Strike the afflicted pitch while someone else moves his or her hands over the soundboard, back, sides, etc.

If after all this you still haven't solved the puzzle, you might consider having your ears checked!

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Do you recommend regular-tension or high-tension nylon strings?

String tension is a matter of personal taste and suitability for each instrument. I prefer high-tension bass strings because they project well and are less likely to buzz. With treble strings, the issue is more complex because there are many varieties of thickness, density, rigidity, and tension currently available. (Some of the popular brands are Augustine Regal and Imperial, and Savarez Red and Blue Alliance.) These factors influence projection, clarity, speed, timbre, sustain, vibrato, and comfort.

To decide which treble strings work best on your instrument, I recommend testing three different brands of the same string simultaneously. With three E's as the first three strings, for example, you can readily compare all of the characteristics I mentioned above. I have found it helpful and fun to share the task with a jury of blindfolded friends. After three hours of hearing only E strings, however, I must admit I thought I was losing my mind. And anyone who might have walked in on the scene would have been certain of it. But the experiment did answer some important questions.

How often do you change strings?

I change bass strings just before they start to buzz, unravel, or turn dull, and I change treble strings when they're about to become scratchy, muted, or out of tune from stretching or fret indentations. How often does that happen? It depends upon what and how much I'm practicing and upon the demands of my performance and recording schedules.

Many factors affect string wear and tear, and for bass strings that includes altered tunings, chemistry, and climate. For example, lowered bass tunings (such as the sixth string at D or C, or the fifth string at G) tend to sound dull sooner than the standard tuning (sixth at E, fifth at A). A lot of switching back and forth between tunings helps to wear out the strings as well.

And don't underestimate chemistry in the assault against bass strings. Luckily, my hands rarely sweat, and if they do, there doesn't seem to be any of the destructive component that plagues some players. In a normal routine of three to four hours a day of practice, I can often use unpolished bass strings for two weeks at a time (polished basses for recording last about a day, however). Players whose hands sweat a lot can go through a new set of bass strings every day or two. (Knowing that may make you think twice about letting anyone try your guitar!) Humid climates also increase the sweat factor. In any case, frequent hand washing temporarily rids fingers of oil and dirt and will extend the life of bass strings.

In long-term use of bass strings, you may also need to guard against unraveling, which leads to breakage. Check the bridge area when you first install the string. If there is a space between the coils at the bone or at the juncture with the curved portion of the

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string, gently press and move the coils to redistribute them so there are no visible spaces. Do the same at the frets if coils begin to separate with use.

The biggest enemies of treble strings are right-hand fingernails, picks, fret pressure, and loss of pliancy. Normal nail use will create small scratches on nylon strings, and the problem is exacerbated by *rasgueado* striking techniques and picks. As the scratches increase, treble strings begin to sound raspy rather than smooth. This becomes particularly problematic in recordings. A good test of your scratch factor is first to smooth out your nail with fine-grade sandpaper, and then glide it lengthwise along the string. Compare the sound above the uppermost frets (in a smoothly finished string) with the sound over the soundhole area where you normally strike. If the string sounds unacceptably raspy, but is otherwise still in tune, resilient, full, and loud, you can continue to use it by unwinding it three inches or so and refastening and shortening it at the bridge. The scratchy patch will now be out of reach. Since tuning readjustment will be less of a problem than with a new string, this “recycling technique” is useful when there is little time between performances.

Normally, I can use treble strings for three months at a time. With such long-term use, however, I routinely check for any indications of unevenness in the strings’ girth. Compare the 12th-fret pitch with its 12th-fret harmonic. If the pitches match, the string is still even (presuming, of course, that your guitar is properly fretted!). If not, change the string.

My performance schedule also influences when I change strings. Since strings require enough time to adjust so that they won’t go out of tune in performances or during recordings, I pace myself accordingly. Whenever possible, I allow ten days for new treble strings to settle in before a performance, and three days or so for bass strings. If I am recording with unpolished bass strings, I allow a week for them to stretch out and become less squeaky. If recording with polished basses (such as La Bella 413P Studio Strings, which don’t squeak and require hardly any adjustment time for tuning), I change them the night before each session.

Why do classical guitarists use footrests? Can I play in a classical style without using one?

Using a footrest under the left foot allows the guitar to rest securely on both legs. The weight of the right arm provides a counterbalance so that no effort is required to keep the instrument motionless while playing. In this position, one can make fast left-hand leaps with precision and maintain right-hand accuracy and dexterity because the guitar remains still. The angle of the fingerboard creates optimal conditions for keeping your back straight and for finding a comfortable left-hand position (a horizontal neck would strain the wrist and limit mobility). Playing with one foot flat on the floor and your legs crossed is not as secure and will also make fingering in higher positions more difficult. It might also encourage circulation problems, such as varicose veins.

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For those players who must keep both feet flat on the floor because of back problems, devices such as cushions and suction cups have been developed to elevate the guitar. The only problem with these is that the guitar tends to wobble during position shifts. When this happens, both right- and left-hand fingering become more treacherous. The right arm may also have a tendency to tense up in an effort to apply more weight to stop the motion. An alternative that can improve stability somewhat is to use a very low footstool in conjunction with one of these elevating devices. One can certainly play in a classical style without a footstool or device that raises the guitar if the pieces don't have rapid or demanding shifts. Anything complex, however, will be problematic when you're hunched over or teetering.

Do you use amplification in performance?

I usually use sound enhancement when playing solo or chamber music in halls that seat more than 700, and I always use it when performing with an orchestra. I use the minimum amount of volume necessary so as to maintain the intimacy and beauty of the instrument. Though it is certainly possible to project forcefully without amplification in large halls, I prefer instead to retain a large dynamic range, a diverse palette of timbral colors, and all the subtle nuances, such as sensuous portamentos (sliding wisps of sound between notes)—much of which is lost when projection becomes the primary concern.

The system I now use was designed for me by two engineer/musicians, Elias Guzman and Bruce Hildesheim. The extraordinary thing about their invention is that no one in the audience is aware that the guitar is amplified. There is nothing to see, because the tiny wireless microphone and battery hook under the soundhole, and the bookshelf-sized wooden box containing two Celestion speakers, a Rane 15-band graphic equalizer, and a Shure wireless receiver and amp is hidden (either behind a curtain, behind the shell, camouflaged against a wall, or within the orchestra). The speaker is also powered by a small battery pack, so no wires or plugs are necessary. The mic fits onto any acoustic guitar and takes about 15 seconds to place. Volume adjustments are made with a small digital remote control that can be operated at the performer's chair. The box should always be placed at least six feet (and up to 15 feet) behind the performer.

The resulting sound is truly amazing. Thanks to a unique omnidirectional design, no matter where I am on stage, it always appears as if the sound is coming directly from the guitar. It is so completely natural, balanced, and absent of fingernail and string noises that everyone in the audience is fooled. When I first used the system in October 1993 playing John Corigliano's concerto with the St. Paul Chamber Orchestra in the Ordway Music Theater (1,800 seats), not even the critics knew. In recital, the benefits are equally inspiring. The system enhances the sound of a dry hall to make the listening experience much more rewarding for the audience. The orchestra managers and con-

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cert presenters who have heard it are astonished that the guitar can sound so clear and natural, and they claim that this is the first time they've heard it so in their many frustrating years of hearing traditionally miked guitars.

If you don't own this system and must rely on the hall to provide sound reinforcement, there are other alternatives. When playing solo, an excellent house system with a high-quality microphone (such as an AKG or a Sennheiser) can provide satisfactory sound enhancement. In situations where the amplification isn't audible on stage, you may wish to request a monitor. If there is no house system, two high-quality speakers can be placed against the side walls, about halfway back from the front of the stage, facing each other (not the audience). Work with the engineer before the performance to make the sound as natural as possible. This involves careful attention to the balance of the bass, treble, and midrange, and avoiding a boomy bass or a tinny treble.

When performing concertos with an orchestra, I used to request a very specific setup. It consists of a directional microphone (rather than an omni to avoid any bleeding from the orchestra) placed on a boom stand near the bridge. Two small speakers (such as Bose 802s or 803s, Meyers, or Apogees) are mounted on two eight-and-a-half-foot adjustable poles and placed next to each other in the center of the *back* of the stage, behind the orchestra. The engineer should be prepared to mix this sound, if necessary, with a slight amount of the house speakers, with the percentage of house usage not to exceed ten to 20 percent of the total.

Before the rehearsal starts, work with the engineer to establish basic levels of equalization and volume. The engineer should make further adjustments during the rehearsal. Be sure the board is set up within the hall or in a booth with an open window so the engineer hears what the audience will hear and can make final adjustments during the performance. I find it helpful to hear another guitarist play for a few moments on stage so I can listen from the hall.

This format has a few of the benefits of the system designed by Guzman and Hildesheim. With the speakers placed behind the orchestra, the conductor, the players, and soloist all hear the solo part clearly and can interact accordingly. Because the speakers are mounted on poles several feet high, the volume on stage is never excessive. When the sound reaches the audience, it has been acoustically enhanced by the stage, just as the sound of the orchestra has been enriched before it reaches the audience. Best of all, what the audience hears appears to come more from the guitar than it would if using a ceiling or wall unit.

In this day and age of high-quality equipment, there is no excuse for bad amplification. Unfortunately, most guitarists do not know what to request, and as a result many conductors and orchestra managers have become soured on the idea of using guitars. The mistake most engineers and guitarists make is either to project exclusively through the

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ceiling cluster, turning the sound into a circus of artificiality, or to rely on upstage side speakers, which split the sound in two and blast the first few rows of listeners. Either way, the sound is schizophrenically detached from the soloist. And often the orchestra can't hear a note the guitarist is playing.

What precautions should I take to protect my guitar when I travel?

Carry your guitar in a strong, sturdy case. It should have a slight arch above the bridge area to allow a margin of safety should sudden pressure ever be applied to the top of the case. If you travel by air and check the guitar, use a large, extra-durable case, such as the fiberglass-reinforced model made by Mark Leaf (322 N. Ash, McPherson, KS 67460). Since baggage compartments are not always pressurized, loosen the strings before flying. Lock the case, affix plenty of "Fragile" stickers, and try to arrange for special handling pickup and delivery at the gate (a growing improbability with increased airport security regulations). Since luggage is frequently lost or damaged, I would recommend that you insure your guitar for its full value.

Another option when traveling by air is to use a regular-sized case and buy an extra seat. Since airlines have various restrictions about where instruments can sit, it is best to make these arrangements adequately in advance.

The third alternative is to try to store your guitar on board. If you plan to do this, be sure that the overhead bins are large enough to accommodate a normal-sized case or that there is unmotorized closet space ("motorized" closets are made for lightweight garment bags, not for guitars).

When traveling to dry climates, always take along a couple of Damp-Its (sponges enclosed in rubber tubes). After wetting the Damp-It, squeeze it out and dry the outside of the tube thoroughly. Anchor it between two treble strings at the soundhole. Clipping it on the wood can damage the finish, and it is likely to fall off and bounce around inside the guitar.

Since carrying the case with a shoulder strap is convenient, some cases have metal loops at each end where the strap can be attached. If you use this system, be sure that the strap is securely fastened before you throw it over your shoulder. I'll never forget the time I got out of a car, lifted the case, placed the strap on my shoulder, and watched in horror as the case smashed onto the sidewalk. A 16-inch crack in the guitar was my reward for being careless.