

*Perfection*TM Planetary Pegs

— A Classically-inspired Innovation —

Frequently Asked Questions

*Perfection*TM

Planetary Pegs

What is the Perfection Peg?

The Perfection Peg is a deceptively simple mechanism with a size, shape and overall appearance closely matching a conventional ebony peg. The patented design enables easy, accurate and stable tuning of the violin, viola or cello without the use of tailpiece-mounted string adjusters. In concept, this is equivalent to mechanisms already in use on the guitar and string bass.

What are the main benefits of Perfection Pegs?

- **Ease, accuracy and stability of tuning.** Perfection Pegs turn with great precision and hold in the desired position until manually adjusted.
- **Time and effort.** More class time and effort can be devoted to teaching and playing rather than tuning.
- **More fun learning, and less hassle** for players, students, teachers and parents.
- **Tuning proficiency.** Because of its ease, students can actually learn this important aspect of playing their instruments in their first year of training.
- **Higher reliability and lower costs of maintenance.** Perfection Pegs are virtually maintenance free and don't create wear-and-tear on the peg box. In addition, all the costs and risks associated with fine tuners are eliminated.
- **Better tone.** By eliminating the fine tuners on the tailpiece (which were never part of the original design of the string instrument), Perfection Pegs restore the full sound potential of the instrument, and remove a main source of rattles and buzzes.

What do schools and teachers think about Perfection Pegs?

Given the tradition-based nature of the violin and the history of other alternative pegs, some initial skepticism is natural. However, once string educators are acquainted with them and have the chance to experience Perfection Pegs personally, they quickly embrace them.

The biggest value is the enormous savings in time and effort that Perfection Pegs offer in a typical classroom setting. With standard friction pegs, it is common for **30% or more** of available class time to be devoted to tuning. Since Perfection Pegs do not slip or stick, they are an ideal solution. Not surprisingly, a growing number of school systems are adopting this feature as a requirement on new instruments and are recommending it on their students' rentals.

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How do Perfection Pegs work?

In basic terms, they employ gears—small, precise, incredibly strong helical gears. Rather than whole-peg rotation and wood-on-wood friction, operation of the internally housed gearing brings each string to its desired tension, and holds it securely in place.

Stated a bit more technically, a player, rotating the head of the peg, is actually turning the main gear (called the sun gear). The sun gear drives smaller gears (called planet gears), which “orbit” between the sun gear and a toothed outer housing (called a ring gear). As the orbiting planet gears are spun about the sun gear, they force the rotation of an elongated housing (called a carrier), which serves as the shaft portion of the peg. The gears are also designed so that the shaft rotates once for every four turns of the peg’s head (called a four-to-one gear reduction). That allows the Perfection Peg to also function as a fine tuner.

What about durability?

If anything, the Perfection Pegs may be over-engineered to ensure durability and longevity. In fact, one might expect that Perfection Pegs will outlast any instrument in which they are installed! Here are some of the details.

The working gears are made from 8650 thru-hardened steel alloy. This same alloy is commonly used for the shafts that drive the propeller blades on helicopters. The ring gear assembly for the cello peg is brass, while for the violin it is aircraft grade aluminum. The carrier/peg shaft assembly is also aluminum. All of the internal parts are permanently lubricated with an ultra-viscous lubricant named 767A Nyogel, the same thing used in various sealed microscope, telescope and binocular gear assemblies. The head is molded from a high-tech plastic called PBT/ABS and the opposite end of the shaft is Delrin, both extremely durable materials.

For any reason, Perfection Pegs can be easily removed by a qualified luthier or technician, and replaced with new Perfection Pegs or conventional ebony friction pegs.

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Are these like the old “tension” pegs (such as Caspari)?

In a word, no. Beyond addressing the universal desire among string players to improve ease and reliability of tuning, there is little similarity between Perfection pegs and tension pegs.

- 1) Unlike tension pegs, the design and manufacture of Perfection Pegs incorporate well established, proven mechanical engineering principles and modern technology.
- 2) Unlike tension pegs, installation (or removal) of Perfection Pegs requires no unusual or invasive modification of an instrument’s peg box. If desired at any point, instruments can be readily refitted with either Perfection Pegs or conventional wooden pegs.

What can happen to Perfection Pegs?

Perfection Pegs are designed for inherently superior reliability and problem-free operation, and offer the many additional benefits that normal pegs lack. Because of their ease of use and ability to hold the desired string tuning reliably, they are subject to significantly fewer instances of aggressive handling than would be the case for poorly fit conventional pegs.

It is possible to temporarily seize up the gear mechanism of a Perfection Peg by shoving the head inward with inappropriate force or from an impact on the peg’s head. If this should happen, the head should be grasped and gently wiggled outward, working it in an alternating clockwise and counter-clockwise manner. This should free the gears for normal operation. If a Perfection Peg becomes dislodged from the peg box, it can be readily re-installed (by a qualified luthier or technician). Since the hole taper and diameter is the same as a conventional peg, one can be used temporarily.

The head of the peg can also be snapped off with a heavy impact. The head can actually be replaced by a qualified technician. (Note that in the event of such an impact, it is preferable for the peg head to snap off than to transfer the impact shock to the scroll and neck, which could damage the instrument.)

Who can install Perfection Pegs?

Installation should be left to qualified technicians and luthiers. Perfection Pegs are not intended for consumer/player installation. Knilling offers the cello pegs on Knilling cellos, as well as separately for after-market installation. Violin and viola pegs are available on Knilling instruments and are installed by the Knilling Custom Shop.