

Understanding the RPT Tuning Exam

Thursday, August 4, 2022, 5th Period
ETSC Tuning Exam Team

What is the RPT Tuning Exam?

The RPT Tuning Exam is one of the three-stage certification exams which the Piano Technicians Guild offers to all members to acquire Registered Piano Technician (RPT) status. Before you can take Tuning Exam, you must pass the Written Exam which covers basic knowledge about tuning, regulation, repairs, and general piano related topics. After passing the Written Exam and receive Reclassification Form, you can take either Tuning or Technical Exam in any order. After completing all three exams, the Executive Board of PTG will certify as an RPT member of PTG. RPT certification is not something like a license, or whatever required to work as a piano technician, but shows your readiness for going out to the field and service your client's piano as a professional piano technician.

What does the RPT Tuning Exam test?

The RPT Tuning Exam tests your ability to tune your client's *home* piano to Equal Temperament at A440 pitch. It is divided into three parts, and each part is divided into a few sections which tests a specific task: setting note A4 at A440 to an aural pitch source; tune a temperament octave; tune the midrange from C3 to B4; tune the bass from C1 to B2; tune the treble from C5 to B6; tune the high-treble from C7 to B7; tune the unisons in the midrange; and stability in the midrange. You'll need to score 80% or higher for each section to pass the exam.

What kind of piano is used for the exam?

A piano used for the RPT Tuning Exam must be a grand piano, minimum of 5'9" long and no wound string from the note C3 and up. It also must be well regulated and voiced for a good quality home piano. (Concert or recording ready quality is not required.)

What is Master Tuning?

Each Exam Piano must be Master Tuned and recorded on a scoring ETD before an exam is administered with it. Master Tuning is done by a committee lead by a Certified Tuning Examiner (CTE) in charge and two (or more) other RPT's. The piano is well prepared and tuned by the CTE (or designated RPT) before the Master Tuning session, then the tuning is scrutinized by the committee until all members agree that it is the best possible tuning as a basis for scoring an examinee's tuning. It's not necessarily a best possible tuning for a performance, but rather a midway of various tuning styles (stretches). When the agreement is reached, each note's offset from mathematical equal temperament is measured with a scoring ETD and recorded.

Structure of the RPT Tuning Exam.

Entire piano is strip muted and each note is detuned pre-determined amount from Master Tuning. The examinee tunes the center strings only for Part 1 and Part 2. Strip mutes in the midrange C3-B4 are removed for Part 3.

Part 1: Pitch; Temperament; Midrange. (45 minutes total, aural only, no use of an ETD allowed.)

- Pitch: set note A4 at 440.0 Hz to an *aural only* pitch source within 5 minutes. The aural only pitch source can be either a tuning fork or an electronic device. If the device has a visual display, such as a smart phone, one of the examiners must remain in the exam room while you are setting the pitch.
- Temperament: chose a temperament octave from C3-C4 to B3-B4 and tune it to equal temperament.
- Midrange: tune the rest of the notes in the midrange C3-B4.

Part 2: Bass; Treble; High Treble. (60 minutes, use of an ETD allowed.)

- Bass: tune notes C1-B2.
- Treble: tune notes C5-B6.

- High Treble: tune notes C7-B7 as *clean-sounding single octaves*.

Part 3: Unisons; Stability. (30 minutes, aural only, no use of an ETD allowed.)

- Unisons: tune the midrange C3-B4 unisons to the center string.
- Stability: stability of a side string of each note of the midrange C3-B4 is tested.

How is the exam scored?

Pitch: examinee's A4 pitch is measured at the fundamental and calculate the offset from 440.0 Hz with a scoring ETD. The offset more than 1.0 cent will be multiplied by 10 and deducted from 100%. For example, if examinee's A4 is 2.0 cents off (sharp or flat), the score will be $100\% - (2.0 - 1.0) \times 10 = 90\%$.

Temperament, Midrange, Bass, Treble, High Treble: the offset from mathematical equal temperament of each note of examinee's tuning is measured at specific partial for each octave with a scoring ETD and recorded. After the average pitch level of examinee's tuning is corrected to A440.0 with *Pitch Correction Number (PCR)*, each note is compared with that of Master Tuning and offset is calculated. If the offset is more than the tolerance (specific for each section), error points will be given to the note. The total of error points in each section is multiplied with a multiplier (specific for each section) and deducted from 100%. For example, if the total of error points in Temperament is 4 (the multiplier is 2.5), the score will be $100\% - (4 \times 2.5) = 90\%$. If the total of error points in Midrange is 7 (the multiplier is 1.5), the score will be $100\% - (7 \times 1.5) = 89.5\%$, then rounded up to 90%.

Unisons: each unison of the midrange (C3-B4) is listened by examiners, then each string of any unclear note is measured with a scoring ETD and differences (Left and Center, Center and Right, Left and Right) are calculated and recorded. A difference more than 0.9 cents will receive error points. For example, a note with L: +1.0 cents, C: 0 cents, and R: -1.0 cents, the total of error points for this note is 4 (L-C: 1, C-R: 1, L-R: 2). This will be 8% deduction for the score (multiplier is 2 for Unisons).

Stability: after Unisons section is scored, stability of one of the side string of each midrange note (C3-B4) is tested with a *Thumper* (key pounding devise). Starting string, either left or right, is randomly chosen, then tested on alternating strings (L-R-L-R... or R-L-R-L...), by measuring the difference before and after three consistent hard poundings. Any change of 1.0 cents or more (drop or rise) will receive 1 error point. For example, if three notes dropped more than 1.0 cents, the score will be $100\% - (3 \times 4) = 88\%$ (multiplier is 4 for Stability).

What is the Pitch Correction Number (PCR)?

PCR is the difference of the average pitch level of the examinee's temperament octave and Master Tuning's temperament octave at A440.0. It is calculated as $\{(\text{total of offsets of examinee's temperament}) - (\text{total of offsets of Master's temperament})\} \div 13$. Positive PCR means the pitch level of examinee's tuning is sharp, and negative PCR means flat. With PCR, examinee's tuning and Master Tuning are compared at the same pitch level. PCR is calculated separately for Part 1 and Part 2.

What if any section is failed?

You need to score 80% or above in any section to pass. If you failed the Pitch section, you'll have a second chance within the remaining time of Part 1 (45 minutes minus time you've spent for the first trial of setting the pitch). In order to pass any Part, you must pass all sections. Failed Parts can be retaken up to twice within 25 months from the date of the original exam. If more than one Parts are failed, they'll need to be retaken together. If Part 2 is failed, you'll need to retake Part 1 & 2 together since Part 2 tuning is based on Part 1 tuning.

What ETD's are allowed for Part 2

Any, as long as you can create a good Equal Temperament tuning for a piano. That said, avoid non-piano-specific devices and apps which don't count the inharmonicity in or have low resolution.

Some tips for Tuning Exam.

- Practice well before attempting the exam. Avoid any new way or tools that you are not used to. Exam situation can be stressful even if you are not aware of it.
- Since entire piano is strip muted, if you usually tune with wedge mutes only, take time to practice with strip mutes, since the feel and how you hear the sound may differ.
- If you use an electronic pitch source, the speaker on the device can produce audible partials which can confuse your listening. Make sure you are listening for correct partial (fundamental) when you use tests for comparing your A4 and the pitch source.
- Practice quick multiple passes to refine your tuning. Detuning is done so that every note will get some error points if left untuned. Quick first pass would reduce or eliminate large errors, then you can refine with the second (and the third) pass. Do not spend too much time for Temperament only in Part 1 in the first pass. You'll need to finish entire Midrange. Before closing up a Part, recheck every note quickly so that no note is overlooked. Practice with a clock or timer set to time limit for each Part. Good time management is the key.
- Utilize different types of aural tests. Even one test sounds fine, other tests may tell another way. Try making nothing sticks out.
- Using different temperament sequence for each pass is one way to reduce or eliminate errors.
- High Treble section requires a specific way to tune, *clean-sounding single octaves*, which is different from most of the tunings in the field, and different tests may be needed.
- Tune unisons as clean as you can for this exam. A "singing" unison may get error points.
- Utilize intervals (5th, 4th, octave, etc.) to make hearing small differences in a unison easier.
- Practice tuning without excess poundings. They can destabilize a tuning rather than stabilize it.