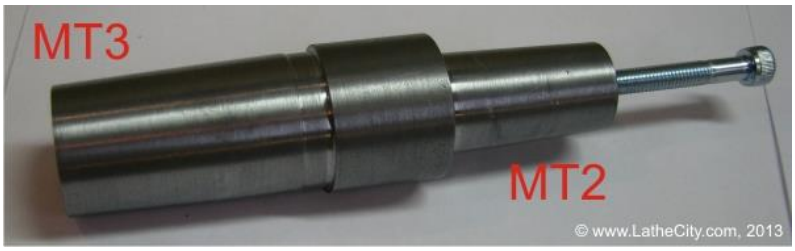



**Buddy Bar for "China" lathes**
**MT3 to MT2**

# FAQ-"Frequently" asked questions / Testing Machintaper

**Fortunately, we have had that conservation so far only once…**

**Customer e-mail. Rudi B, MN:** I just got the buddy bar and measured the end of it. I get 0.6985", but it should be 0.7000. Thus, the thing doesn't fit and I send it back.

**LatheCity.** Rudi B., you can return all LatheCity items within 2 weeks after purchasing day (eBay) or after 4 weeks when it was a factory direct sale. Shipping costs are up to you. However, please repeat your measurement and let us know what you get.

**Rudi B, MN:** I measure now 0.7003" which is still incorrect.

**LatheCity.** Repeat that measurement 5 times and you will get 5 different values. Every measurement comes with an uncertainty. In addition, you try to measure a sloped surface. That's not very precise.

**Rudi B, MN:** I don't like this and send it back.

**LatheCity:** You may do so as we told you before.

We do under-cut Morse taper rather than over-cutting them. The effect is that the taper will stick out of the arbor a little more. In so doing, our tools are compatible with 99% of all China lathes.

Try the following: use your best taper and stick it in 3 different tailstock arbors or drill sleeves. Label the taper at the edge (using e.g. a sharpie pen) just where it sticks out of the arbor. Does that label match the entrance of all arbors perfectly?

**Rudi B, MN:** No it doesn't. For every arbor I tried the taper sticks out differently.

**LatheCity:** Well, perhaps you should send back all the arbors then since you used the very same taper to test all the arbors, right. Just kidding.

**Rudi B, MN:** Yes.

*Buddy bar in a Morse test arbor. We see the small diameter end in this photo.*

**LatheCity:** Try a last thing. Make test arbors using a Morse reamer and cut these arbors to different length, say 0.5", 1", 1.5", 1.75". However, machine these with

the reamer to the same large diameter. Now, stick in the taper and see if the small diameter end fits properly in all the arbors. You may use feeler gages to see how large the deviation is. Typically it's not more than a few thousands of an inch. Thus, the taper angle of that taper is cut very precisely. That's how you can test the fit of Morse arbors and that's how we do it. You will always feel a small jiggle if you rock on a long machine taper since there is always a tiny misfit between the taper and the arbor. Nothing is perfect in the real world.

*MT2 Morse test arbors we use in the shop. These here are for MT2.*

Make sure that you have sharp edges on the small diameter inside end of your test arbor and taper otherwise you will see/measure the curvature of the deburing. Don't touch sharp edges with your fingers. Whatever you do obey all safety rules for metal work including the use of safety glasses.

**Rudi B, MN:** How do you make the tapers?

**LatheCity:** We machine Morse taper on a lathe with a setup similar to our LASER protractor (also available at www.LatheCity.com). With a screen at a distance of 15 ft. we have an angle accuracy of about 0.01 degree. For example, we can easily distinguish the angle setting for a Morse #0 and Morse #1 taper. That angle setting is typically cross-checked with an electronic angle protractor that has an accuracy of 0.05 degree. (That's presently the best one available.)

**Rudi B, MN:** Sounds pretty good, but a grinder is better.

**LatheCity:** Not necessarily, also on a tool post grinder (approx. $2,000, the same as a small lathe) one has to set the angle. Thus, it's basically the same game. Yes, there are CNC grinder which are more accurate. These start at $100,000. Thus, one would need to sell a lot MT2s for $10/piece to break even. Grinder are used to form hard to machine materials.

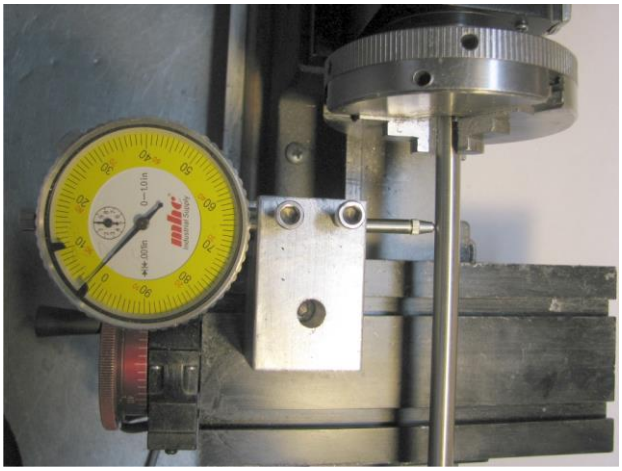


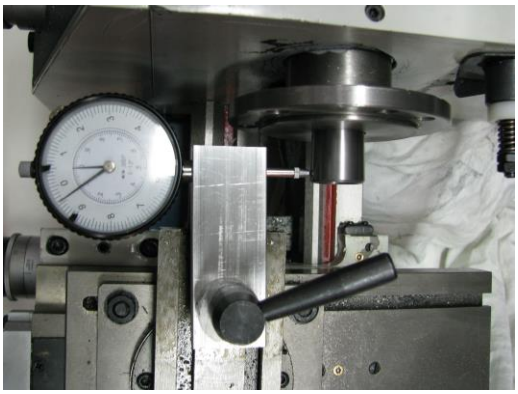
*Fig from LatheCity vol. 1. Measuring the runout of a work piece. Make sure that the dial indicator is properly centered or you won't measure the correct runout. (That's a cheap 0.001"indicator.)*

**Rudi B, MN:** What about the jiggle?

**LatheCity:** You can also measure the runout of the adapter using an indicator dial on the tool post when inserting the taper directly in the spindle of your lathe. That's what we do and we see a TIR of 0.002" to 0.004" and less. Most China lathe spindles have a runout of 0.002" at best. Thus, that's the limit anyway.

We don't say that our buddy bars are perfect, but they are sufficient to get a good alignment of the tailstock if you lost the original factory setting. In addition, using a buddy bar is more convenient that using dead centers etc.

We do offer buddy bars for Sherline lathes MT1-MT0, for UNIMAT, and for typical China import lathes MT3-MT2. Other sizes can be made.



*TIR measured on a China lathe. (That's a 0.0001" indicator.) Electronic indicators aren't better.*

**Fortunately, we got only once this kind of e-mail and have written it down here more or less. We thought this may be an "entertaining" way to explain how to measure a machine taper. Other options are possible.**