Test Fixture Set-up

Indicator set-up for ANSI, DIN or ISO Standard Toolholders:

1. Clean the inside angle of the taper test gauge and the taper of the toolholder with a lint free shop towel.

2. Carefully insert the toolholder into the test fixture. Do not allow the small end of the toolholder to nick the inside of the test fixture.

3. Rotate the toolholder until the large locator pin on the bottom of the test fixture is in the slot of the toolholder with the drilled hole for balancing. The toolholder should be rotated while it is being pushed upwards lightly, until the pin is against the side of the toolholder drive slot. (Note: The toolholder will rotate clockwise or counter-clockwise. Always rotate in the same direction for each test sequence.)

4. Loosen the set screw holding one of the three indicators and move the indicator until the indicator needle moves 1/3 of a revolution or .0033" and tighten the set screw. Do not over tighten the set screw. Over-tightening will cause the indicator stem to bind and not move freely. (Adjusting the indicators so that the "0" is in the same orientation on each dial, this will make them easier to read during testing.)

5. Repeat the procedure until all three indicators are set the same.

6. Set the side indicator in the same manner as the three top indicators. Future adjustment of this indicator should be unnecessary.

Warning:
If the test fixture indicators are set for JIS or JMTBA Standard toolholders and a toolholder from an ANSI, DIN, or ISO standard is inserted into the test fixture, the three indicators on the top of the test fixture will hit the limits of travel of the indicator stems and the indicators may be damaged.

Performing Toolholder Tests

Note: Remember to always clean the test gauge and toolholder before testing. Both the test fixture and the toolholder(s) should be at room temperature for valid results.

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1. After setting the test indicators, insert the toolholder that is to be tested into the fixture and set all indicators to "0". (Refer to #3 above.)

2. Remove the toolholder and insert and tighten the retention knob to the desired torque setting.

3. Wipe off the toolholder again and insert it into the future.

4. Read the three top indicators. The exact distance moved by the toolholder is determined by averaging the readings from all three top indicators. The AT3 grind limit on the toolholder shank has a total tolerance of .0000787. If the average of the movement of the toolholder out of the test fixture is .0007" of an inch, calculate the increase in diameter in the following way:

Example: 7 X .000029" = .000203"
.000203" / .0000787" = 2.57 Grind limits or 1.57 grind limits over high limit.

Check the Toolholder for Looseness

Hold the test gauge with one hand the toolholder with the other hand. Move the toolholder back and forth, trying to force the large end of the toolholder toward and away from the indicator mounted at the base of the gauge.

Try to move the toolholder away from the indicator. If there is any movement at this point (the gauge line of the toolholder), the toolholder will move when a cut is taken. The tool will not locate in the same exact position when it is loaded into the spindle by the tool arm of the machine.

Calculating the Run Out of the Cutting Tool

If the gauge moves 4 lines (.0004") the run out at the gauge line is .0004". Multiply this value by the number of time the tool tip is greater than the length of the toolholder from the small end to the gauge line.

Example:
The length from the small end to the gauge line on an ANSI toolholder is 2.687". The tool tip is 8.000" from the face of the spindle.

Therefore, 8.000 / 2.687 = 2.9 (Toolholder length / gauge length = 2.97 gauge lengths)
2.97" X .0004" = .0011" (Gauge length X Run out at gauge line = 0011" TIR).
.0011" + .0004" = .0015" TIR at the tool tip.

Using this example, the closest tolerance a boring bar could hold would be .0015" in diameter. There should be no movement at the gauge line (side gauge) if the tools are to perform as designed.

Checking Tools in a CNC Mill for Bulge

Checking is the same as above except the toolholder is inserted into the gauge with the retention knob placed in the toolholder first.

1. Wipe the toolholder off with a clean towel.

2. Place the toolholder in the test gauge setting the indicators to "0".

3. Remove the toolholder from the test gauge and remove the retention knob.

4. Place the toolholder back in the test gauge and read the three dial indicators. Average the readings and multiply that value by .000029" to determine the total growth of the toolholder caused by the retention knob.

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Checking New Toolholders for Variation in Bulge

Two hardened and ground threaded test masters are included with the test Taper Shank Test Fixture. The short thread test master will test for bulge in toolholders if you are using retention knobs made to any of the 5 world standards. The longer threaded test master will test for bulge in the toolholders if you are using the new High Torque Retention Knob.

Note: During test for bulge in the toolholders when using the same retention knob in holders made by the same manufacturer and the same type of toolholder the holders did not last the same. This indicates there other factors which must be affecting the amount of bulge in the toolholders. All the dimensions of the toolholders were to the respective standards specifications.

The heat treating was suspect as the cause of the variation in test results. In order to verify this by using hardened and ground test masters which is made out of tool steel through hardening to 60· 62 Rc minimum, any variation caused by the retention knob made from 8620 steel which was case hardened would be eliminated. Using modern heat treating furnaces large baskets are used and loaded with as many parts as possible to reduce heat treating costs. This results in the oil used to quench the parts varying in temperature greatly from the time the first parts are submerged to the time the parts at the top of the basket are submerged, also the parts in the middle of the basket are cooled slower than the parts at the outside and corners of the basket.

Testing New Toolholders for Heat Treat Uniformity

1. Line up the toolholders in the order in which you want them tested. Keep them in this order while testing.
2. Select the test master that has the same thread configuration as the retention knobs that you are going to use.
3. Clean the taper of the toolholder with a lint free shop towel.
4. Insert the toolholder that is to be tested into the fixture and set all indicators to "0".
5. Remove the toolholder and insert and tighten the test master to the desired torque setting.
6. Wipe off the toolholder again and insert it into the fixture.
7. Read the three top indicators.
8. Record the average readings and keep them in the same order as tested.

If the test indicates that the toolholders are uniform there is no problem.

If there are parts that show excessive bulge you may want to return the toolholders for replacement by the supplier.

Storage of the Taper Test Gauge

Return the Taper Shank Test Fixture to the storage case when not in use. The test fixture should be oiled to prevent rust. Oil on indicator lenses should be removed for storage.

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