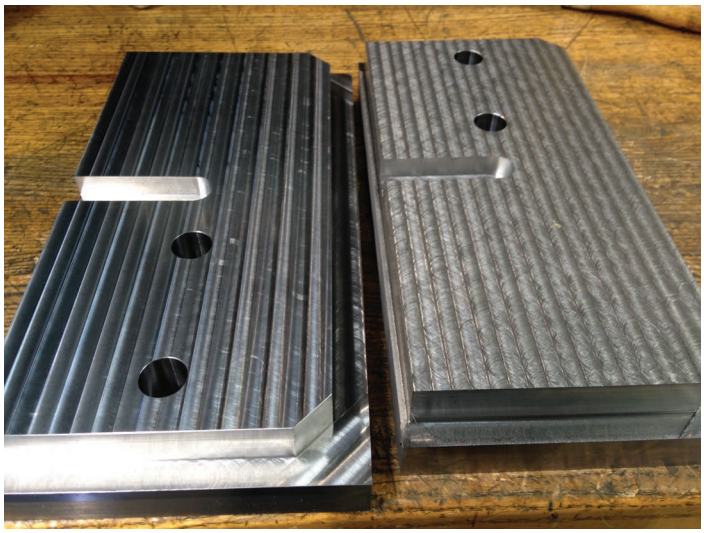
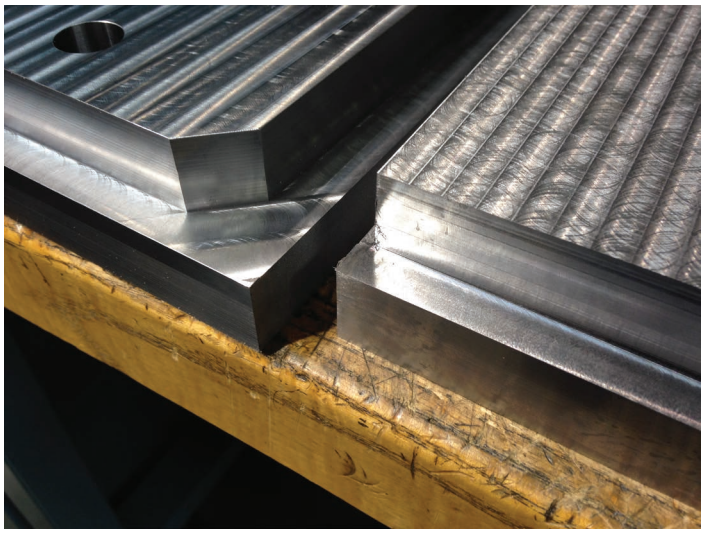
JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization

SAMPLE EVALUATION REPORT





JM31514HT	JM31514	JM31514HT	JM31514

Toolholder: Big Plus CV40 Shrinker Tool
End Mill: Kennametal HPHV500S4125 KCPM15
Machine: Haas VF2
Retention Knob: JM31514HT (Photo on Left)
Retention Knob: JM31514 (Photo on Right)

Distributor:
Precision Tool & Distribution
Jai Prasad
President
www.pt-d.com

3/12/2014
Distributors Report:

Customer ran two parts, the part on the right side of each photograph with a Kennametal end mill, HPHV500S4125 KCPM15, in a Big Plus CV40 Shrinker Tool with a JM31514. They put in the new JM31514HT High Torque Retention Knob and changed nothing, but the retention knob and the part on the left is what they got. Needless to say this made a huge believer out of them.

Jai Prasad

Your partner in milling machine optimization

JM PERFORMANCE PRODUCTS, INC.
The Industry Leader in Milling Machine Optimization

JM Performance Products, Inc
1234 High Street
Fairport Harbor, OH 44077
1(800) 322-7750
www.jmperformanceproducts.com

Taper Shank Test Fixture

The surface area contact between a toolholder and the spindle is the most critical factor for machine rigidity. The higher the percentage of taper contact with the spindle results in improved cutting performance and tool-changing operations. For maximum rigidity 85% to 90% taper contact needs to be achieved.

Referencing ISO 1947, angular taper tolerance (AT) specifications for machine spindles are "AT2 or better" and "AT3 or better" for toolholders.

The Taper Shank Test Fixture is used to check toolholder taper deformation. When a standard retention knob is installed into a toolholder, it can expand the small end of the taper of the toolholder. When the toolholder is expanded, taper contact can be reduced by as much as 70% and no longer meets the AT3 taper tolerance specifications.

Benefits

- **Quickly check toolholders for taper deformation and improve contact between toolholder and spindle.**
- **Proper taper contact reduces spindle and toolholder wear.**
- **Reduced overall milling costs**

Features

- **Precision Mitutoyo gages that read in increments of 1/10,000 of an inch.**
- **Ground to mirror a machine spindle with an AT2 taper.**
- **Formula for calculating toolholder run-out.**

Applications

- **Production Milling, Aerospace, Tool Crib Managers, Machine Maintenance, Multi -Axis**

Available Sizes

- **30 Taper** • **40 Taper** • **45 Taper** • **50 Taper** • **60 Taper**

JM PERFORMANCE PRODUCTS, INC.
The Industry Leader in Milling Machine Optimization

JM Performance Products, Inc.
1234 High Street
Fairport Harbor, OH 44077
1(800) 322-7750
www.jmperformanceproducts.com

JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization

Your partner in milling machine optimization

JM Performance Products, Inc
1234 High Street
Fairport Harbor, OH 44077
1(800) 322-7750
www.jmperformanceproducts.com

JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization

Our Goal

- Reduced Harmonics
- Enhanced Tool Performance
- Tool Holder Rigidity
- Increased Profits

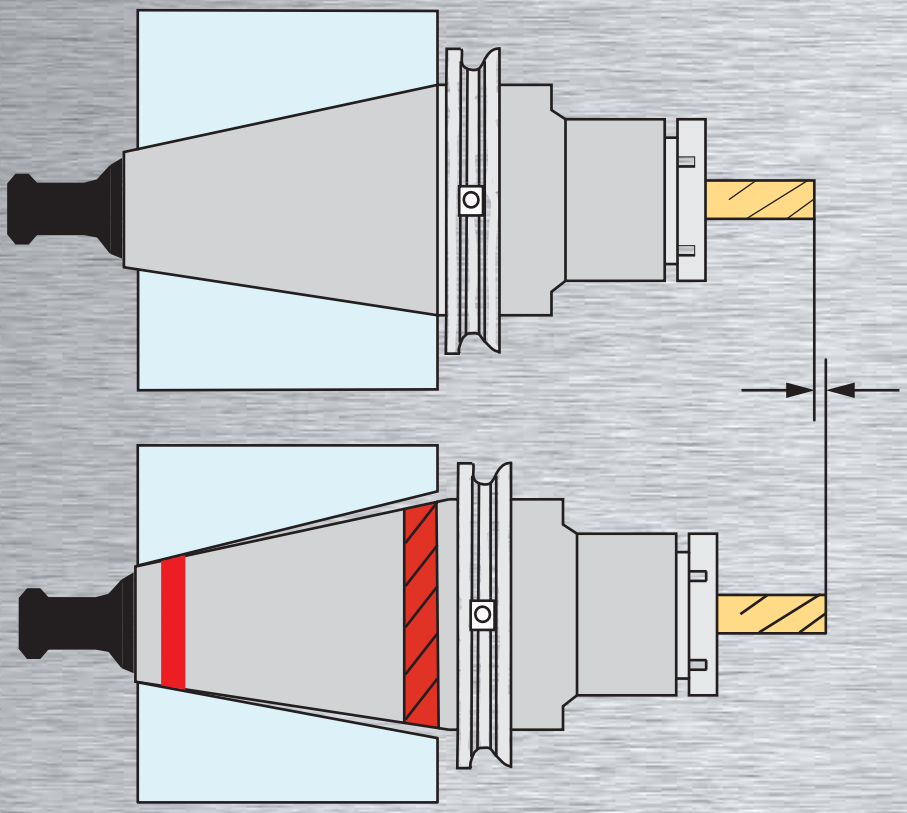
How It's Accomplished

- ☑ Improved Tool Holder Fit
- ☑ Eliminate Tool Holder Expansion
- ☑ Lower Cutting Force Variations
- ☑ Improve Tool Life

Your partner in milling machine optimization

JM PERFORMANCE PRODUCTS, INC.

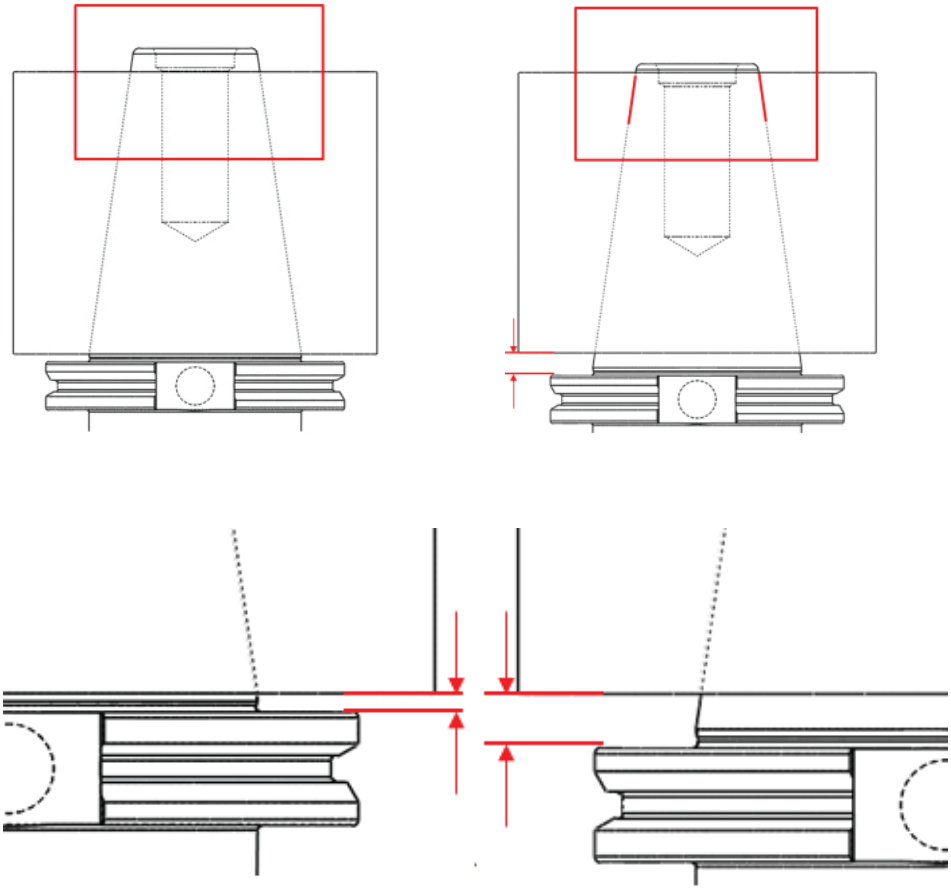
The Industry Leader in Milling Machine Optimization



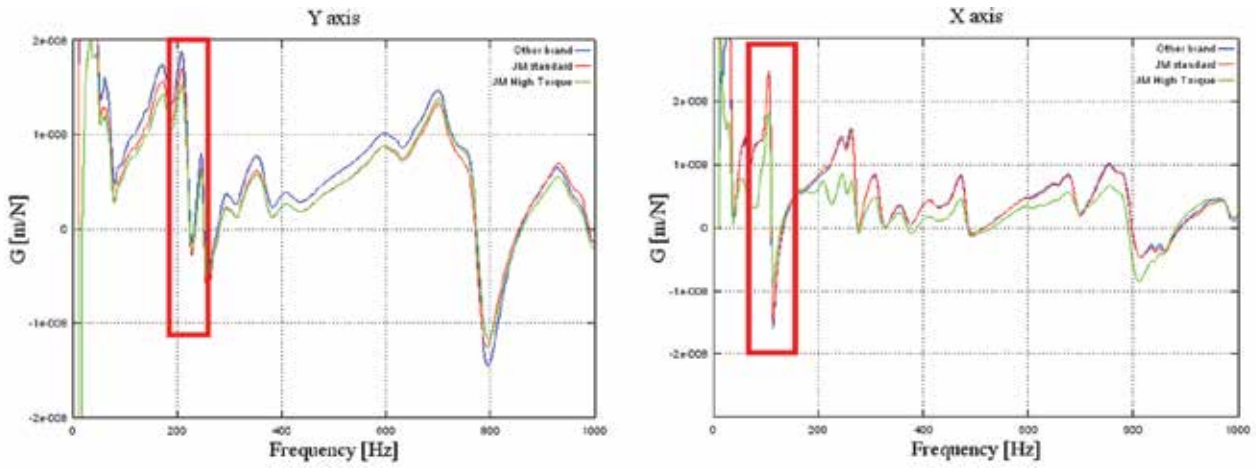
The red line indicates the elastic zone of the tool holder. This area is expanded by the standard retention knob.

The red line with slashes indicates the fretting marks found on a tool holder. Fretting marks develop from a tool holder that is free to move in the spindle.

When the tool holder taper is deformed, it prevents the tool holder from properly seating with the spindle. This elastic zone makes contact with the spindle before the full taper is engaged. The tool holder is only engaged with the elastic zone and the tool holder is free to move at the gage line. This movement at the gage line is what produces the fretting marks found on the tool holder.



When A Tool Holder Taper Is Expanded Do You Have Simultaneous Contact?



When testing the same tool holder for stiffness on the X-axis and Y-axis a conclusion can be drawn that modal stiffness is directly correlated to tool holder expansion. On the X-axis a 40% improvement can be found and a 21% improvement on the Y-axis

Standard Retention Knob

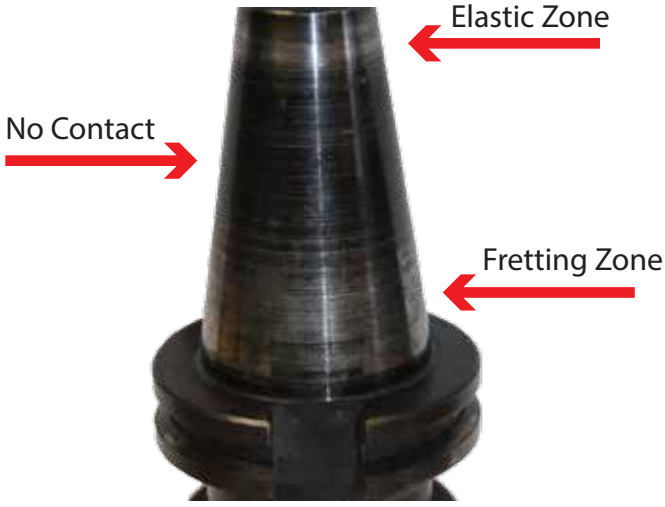
High Torque Knob

The patent pending design of the High Torque Retention works by placing the force of the threads into a deeper cross-section of the tool holder.

The change of thread placement along with a precision pilot prevents the tool holder from expanding the taper of the tool holder.

THIS IS WHAT YOU WANT YOUR TOOL HOLDERS TO LOOK LIKE

Even Wear Pattern

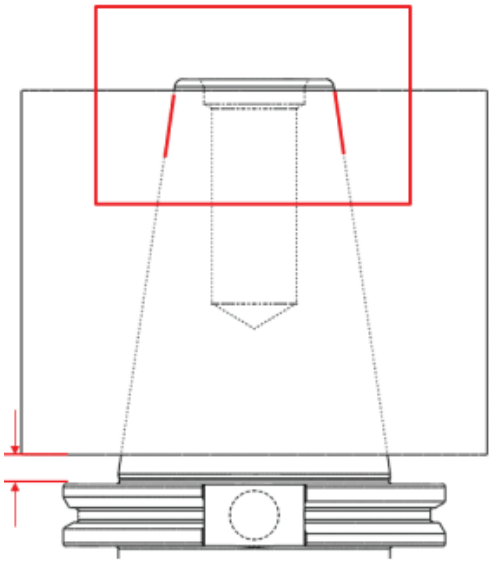


Poor Wear Pattern

JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization

The effects of an expanded Tool Holder



Diameter Expansion	Distance Short Of Full Engagement In Spindle
.00001458"	.00005"
.0000291"	.0001"
.0001455"	.0005"
.00029166"	.0010"
.0004374"	.0015"
.000582"	.0020"

As Diameter Increases The Tool Holder Falls Out Of The Spindle

Tool Life Diminishes As Axial Movement Is Increased

Observed Insert Wear After 93.4 Cu In Of Material Removal

At $25.13 Per Insert The Cost To Remove 356.7 Cu In

$301.56	$75.19
Total Removal Before Tool Failure 93.4 Cu In	Total Removal Before Tool Failure 356.7 Cu In
Diameter Increase At Gage Line:	Diameter Increase At Gage Line:
.00029166"	.00001458"

Observed Insert Wear After 93.4 Cu In Of Material Removal

Tool Life Increased By 3.374 Times

JM PERFORMANCE PRODUCTS, INC.

The Industry Leader in Milling Machine Optimization

5 Step CNC Mill Optimization Program

STEP 1: Clean the spindle
Proper cleaning of the spindle eliminates the accumulation of grease, dirt, and other materials which cause build-up between the taper of the tool holder and spindle. This build-up prevents proper seating of the tool holder taper with the taper of the spindle, causing variable positioning of the tool holder.

STEP 2: Restore the spindle
Chips, moisture and gummy oil in the spindle can result in uneven spindle wear and shorter tool life. Regular cleaning will extend the time between costly major spindle maintenance and regrinds by eliminating high spots caused by debris and rust. These high spots contribute to tool holder movement, while rust can pit the spindle.

Step3: Inspect the Tool Holder
Improving the connection between the tool holder and the spindle is essential to improving tooling performance and to holding critical dimension in production. Holders should be checked for hardness, wear, and expansion. Tool holders that are inspected that have a diameter expansion of .0002" or greater should not be used and exchanged with manufacture.

Step 4: Monitor Drawbar Force
Optimal drawbar force is essential, especially where high spindle speeds, precision boring, or heavy cutting forces are required. Frequent testing, along with maintenance of long term test records will aid in diagnosing spindle drawbar problems. Preemptive spindle maintenance will help minimize down time and the expense of a machine crash from a dislodged tool.

Step 5: Install the right Retention Knob Correctly
Proper Torque settings are crucial for retention knob installation. Over torqueing expands the holder and stresses the knob; insufficient torque exacerbates the elasticity properties of steel, stretching and eventually snapping the knob.

The High Torque Retention Knob was designed to stop tool holders from expanding.

Spindle Cleaners - Taper Restoration Kits - Taper Shank Inspection Gage
Drawbar Gages - High Torque Retention Knobs

JM PERFORMANCE PRODUCTS, INC.
The Industry Leader in Milling Machine Optimization