# Straight Thread Inspection

# STRAIGHT THREAD GAGES

# Straight Thread Inspection System Solutions

## Straight Thread Base System (SBP-400)

### 0” - 4”

- ***Acme (2 - 18 pitch)***
- ***Stub Acme (2 - 18 pitch)***
- ***Stub Acme Mod 1 (3 - 18 pitch)***
- ***Stub Acme Mod 2 (4 - 20 pitch)***
- ***UN Series (2 - 28 pitch)***
- ***UNR Series (2 - 28 pitch)***
- ***Metric (1.5 - 4 mm pitch)***
- ***7 x 45 Buttress (2 - 18 pitch)***

**Base System Includes:**

- External pitch diameter gage
- Internal pitch diameter gage
- External functional size gage
- Internal functional size gage
- Internal thread height gage
- External thread height gage
- Lead gage
- Lead gage standard (specify pitch)*
- Thread profile(s)*
- TDWIN software
- Two sets of thread rolls (specify form & pitch)*
- All necessary contact points (specify form & pitch)*

****Base System is for one specific form and pitch. Additional thread rolls, contact points, or standards for additional forms and pitches are available at the package price.***

## For Additional Sizes and Pitches,

### 4” - 8” Add-on Solution

**SBP-400-1A Add-on Includes:**

- RG-7001
- PD-8002
- Lead gage standard (if necessary)*
- Thread profile(s)*
- Two sets of form and pitch specific thread rolls*
- Two sets of contact points (form and pitch specific)*

****Add-on Solution is for one specific form and pitch. Additional thread rolls, contact points, profile, or standards for additional forms and pitches are available at the package price.***

***Full solutions for specific form, size, and pitch are available for 4” - 8” and 8” - 12”.***


## Choose Your Add-on:

### 8” - 12” Add-on Solution

**SBP-400-2A Add-on Includes:**

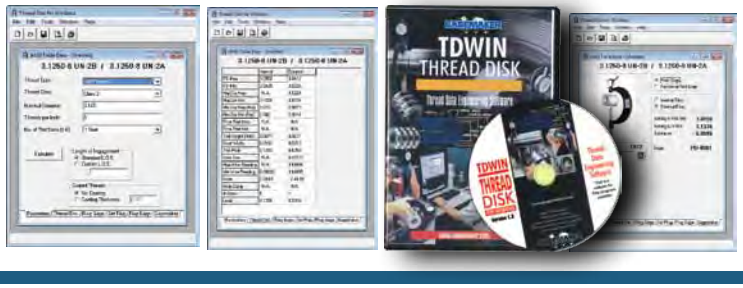
- RG-7002
- PG-6001
- PD-8002
- PD-6001
- Lead gage standard (if necessary)*
- Thread profile(s)
- Two sets of form and pitch specific thread rolls*
- Two sets of contact points (form and pitch specific)*

***Add-on Solution is for one specific form and pitch. Additional thread rolls, contact points, or standards for additional forms and pitches are available at the package price.***

***For larger than 12” or custom sizing, please contact Gagemaker at 713-472-7360 or sales@gagemaker.com***

# Straight Thread Inspection System

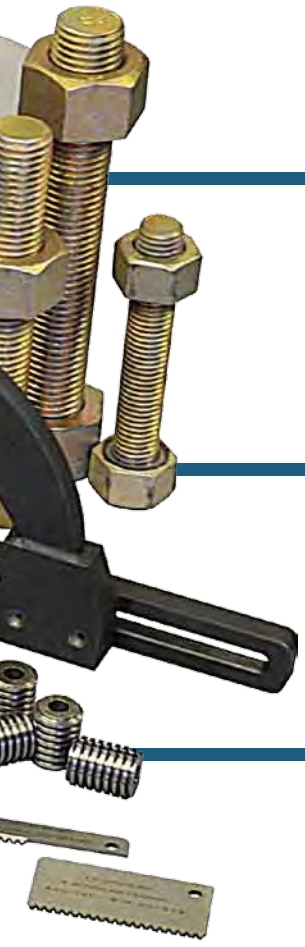
Today's dynamic manufacturing environment overwhelms old "GO/NO GO" methods and only our Straight Thread Inspection System consistently goes above and beyond. An effective Straight Thread Inspection System should measure all of the vital thread attributes - *Functional Thread Size*, *Pitch Diameter*, *Thread Lead*, *Thread Height*, and *Thread Form*.




## Inspection Setup & Tolerances

## Functional Size

## Pitch Diameter




## Thread Lead

## Thread Height




## Thread Form

# Thread Inspection Setup and Tolerances

The Thread Disk engineering software (**TD**WIN) calculates critical dimensions for threads based on ANSI tables and formulas.


Thread types supported by the program include:

- UN Series
- UNJ Series
- UNR Series
- Acme
- Stub Acme
- Stub Acme Modified I
- Stub Acme Modified II
- Metric M & MJ
- 7º X 45º Buttress
- General Purpose Pipe Threads

## *Thread Disk Software - Straight Thread Dimensions*

To generate critical dimensions instantly, enter basic thread information on the Thread Type Entry screen, such as: thread type, thread class, nominal diameter, and threads per inch. Once the results are computed, tabs at the bottom of the program allow selection of several types of calculated information, including dimensions and tolerances for product threads, ring gages, set plugs, plug gages or Gagemaker's Thread Diameter gages.

If measuring internal and external shallow taper diameters is a problem, the Ball Mic SET DIM Tool provides setting dimensions for ball micrometers or Gagemaker's BX-1000 groove gage. The program calculates ball mic settings for any tapered surface geometry.

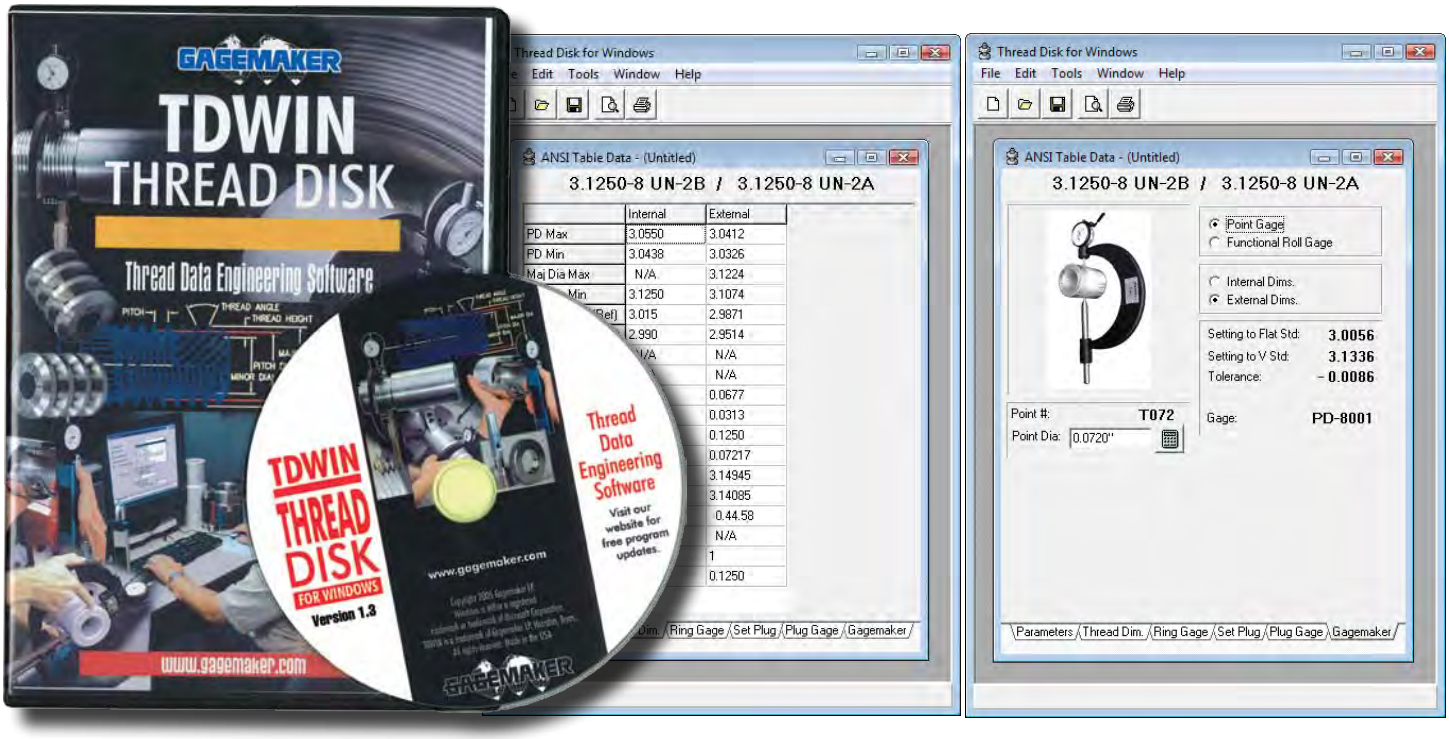
Other features of the program include the ability to print thread dimension reports, providing a paper copy of any calculation. These reports provide the same critical dimensions that display in the program. A multiple calculation window capability is a feature that allows performing several different thread calculations in one session.

***System Requirements***

- Windows XP or higher
- 3 MB of free hard disk space
- 64 MB RAM
- CD-ROM drive

***Features***

- *Uses ANSI tables, formulas, and tolerances*
- *Calculates standard and non-standard product thread diameters from #000 to 99.8"*
- *Calculates ANSI ring and plug gage dimensions*
- *Addresses pitches from 1 to 400*
- *Calculates Gagemaker style thread gage setting dimensions*




| Model | Description |
|---|---|
| **TD**WIN | Thread Disk software |
| **TD**WIN-Network | Multi-user license agreement |

# Thread Functional Size Inspection

Functional gauging takes into account the cumulative effects of diameter, lead, taper, flank angle and form error. Experience the same functionality of ring and plugs with the added benefit of accurately inspecting a range of sizes.

Functional thread inspection gages, or GO/NO GO gages, measure thread diameters. These functional gages are adjustable within a size range and use interchangeable thread rolls to measure different pitch threads.

Setting dimensions for the functional pitch diameter gages are provided by the **TD**WIN Thread Disk software.

## *External Functional Size Gages (⅝" to 24" Diameters)*

These functional inspection gages measure external GO/NO GO thread diameters. ***Software (see page 10) and thread rolls (see page 13 or 117) are sold separately.*** For gages with ranges greater than 12", please see page 116. Higher resolution indicators are also available.

| Model | Description | Range | Resolution | Travel |
|---|---|---|---|---|
| RG-7000 | External Thread Roll Gage | ⅝" - 4" (15.9 mm - 101.6 mm) | .0005" | ½" |
| RG-7001 | External Thread Roll Gage | 4" - 8" (101.6 mm - 203.2 mm) | .0005" | ½" |
| RG-7002 | External Thread Roll Gage | 8" - 12" (203.2 mm - 304.8 mm) | .0005" | ½" |

## *Internal Functional Size Gages (1½" to 24" Diameters)*

Gagemaker also manufactures functional inspection gages that inspect internal GO/NO GO thread diameters. ***Software (see page 10) and thread rolls (see page 13 or 117) are sold separately.*** For gages with ranges greater than 16", please see page 116. Higher resolution indicators are also available.

| Model | Description | Range | Resolution | Travel |
|---|---|---|---|---|
| PG-6000 | Internal Thread Roll Gage, 4½" reach | 1½" - 9" (38.1 mm - 228.6 mm) | .0005" | ½" |
| PG-6001 | Internal Thread Roll Gage, 4½" reach | 9" - 16" (228.6 mm - 406.4 mm) | .0005" | ½" |



## UN Series (60° "V") Thread Rolls

"TRV" thread rolls inspect the functional fit of machine threaded parts with 60° "V" thread forms. These thread rolls are designed specifically for internal or external applications. Rolls are sold in matched sets (2 rolls). Specify thread pitch when ordering. Finer pitches are available upon request.

| INTERNAL THREAD DIAMETERS (1½" & Larger) | | EXTERNAL THREAD DIAMETERS (1½" & Larger) | |
|---|---|---|---|
| **Model** | **Description** | **Model** | **Description** |
| TRVI-4P | 4 pitch internal 60° "V" | TRVE-4P | 4 pitch external 60° "V" |
| TRVI-5P | 5 pitch internal 60° "V" | TRVE-5P | 5 pitch external 60° "V" |
| TRVI-6P | 6 pitch internal 60° "V" | TRVE-6P | 6 pitch external 60° "V" |
| TRVI-8P | 8 pitch internal 60° "V" | TRVE-8P | 8 pitch external 60° "V" |
| TRVI-10P | 10 pitch internal 60° "V" | TRVE-10P | 10 pitch external 60° "V" |
| TRVI-12P | 12 pitch internal 60° "V" | TRVE-12P | 12 pitch external 60° "V" |
| TRVI-14P | 14 pitch internal 60° "V" | TRVE-14P | 14 pitch external 60° "V" |
| TRVI-16P | 16 pitch internal 60° "V" | TRVE-16P | 16 pitch external 60° "V" |
| TRVI-18P | 18 pitch internal 60° "V" | TRVE-18P | 18 pitch external 60° "V" |
| TRVI-20P | 20 pitch internal 60° "V" | TRVE-20P | 20 pitch external 60° "V" |

## Acme and Stub Acme Thread Rolls

"TRA" and "TRSA" thread rolls inspect the functional fit of parts with 29° Acme and Stub Acme thread forms. Sold in matched sets of 2 rolls. Specify the pitch of the thread when ordering. Finer pitches are also available.

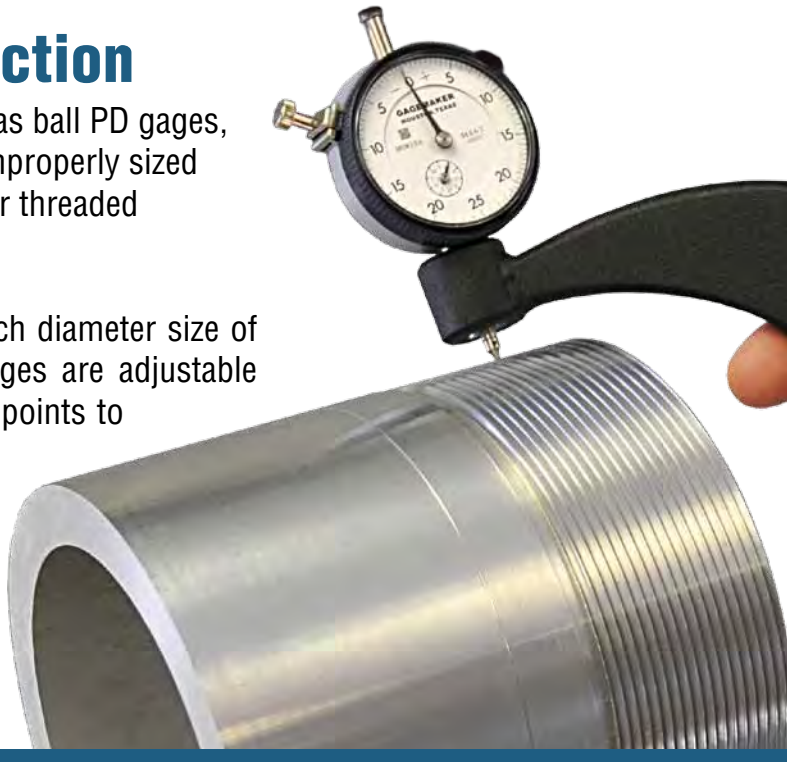
| Acme Thread Diameters (1½" & Larger) | | Stub Acme Thread Diameters (1½" & Larger) | |
|---|---|---|---|
| **Model** | **Description** | **Model** | **Description** |
| TRA-2P | 2 pitch 29° Acme | TRSA-2P | 2 pitch 29° Stub Acme |
| TRA-3P | 3 pitch 29° Acme | TRSA-3P | 3 pitch 29° Stub Acme |
| TRA-4P | 4 pitch 29° Acme | TRSA-4P | 4 pitch 29° Stub Acme |
| TRA-5P | 5 pitch 29° Acme | TRSA-5P | 5 pitch 29° Stub Acme |
| TRA-6P | 6 pitch 29° Acme | TRSA-6P | 6 pitch 29° Stub Acme |
| TRA-8P | 8 pitch 29° Acme | TRSA-8P | 8 pitch 29° Stub Acme |
| TRA-10P | 10 pitch 29° Acme | TRSA-10P | 10 pitch 29° Stub Acme |
| TRA-12P | 12 pitch 29°Acme | TRSA-12P | 12 pitch 29° Stub Acme |
| TRA-14P | 14 pitch 29° Acme | TRSA-14P | 14 pitch 29° Stub Acme |
| TRA-16P | 16 pitch 29° Acme | TRSA-16P | 16 pitch 29° Stub Acme |
| TRA-18P | 18 pitch 29° Acme | TRSA-18P | 18 pitch 29° Stub Acme |

***For ISO Metric Series, National 7° X 45° Buttress Series, and Trapezoidial Thread Rolls please see pages 117. Custom thread rolls are available.***

# Thread Pitch Diameter Inspection

Gagemaker pitch diameter gages, commonly known as ball PD gages, verify that your part is within allowable tolerances. Improperly sized pitch diameters compromise the load capacity of your threaded components.

The ball pitch diameter gages gages indicate the pitch diameter size of the product's external and internal threads. The gages are adjustable within a size range and use interchangeable contact points to measure different pitch threads. Setting dimensions for the pitch diameter gages are provided by the **TD**WIN Thread Disk software.



## External Pitch Diameter Gages (0" to 12" Diameters)

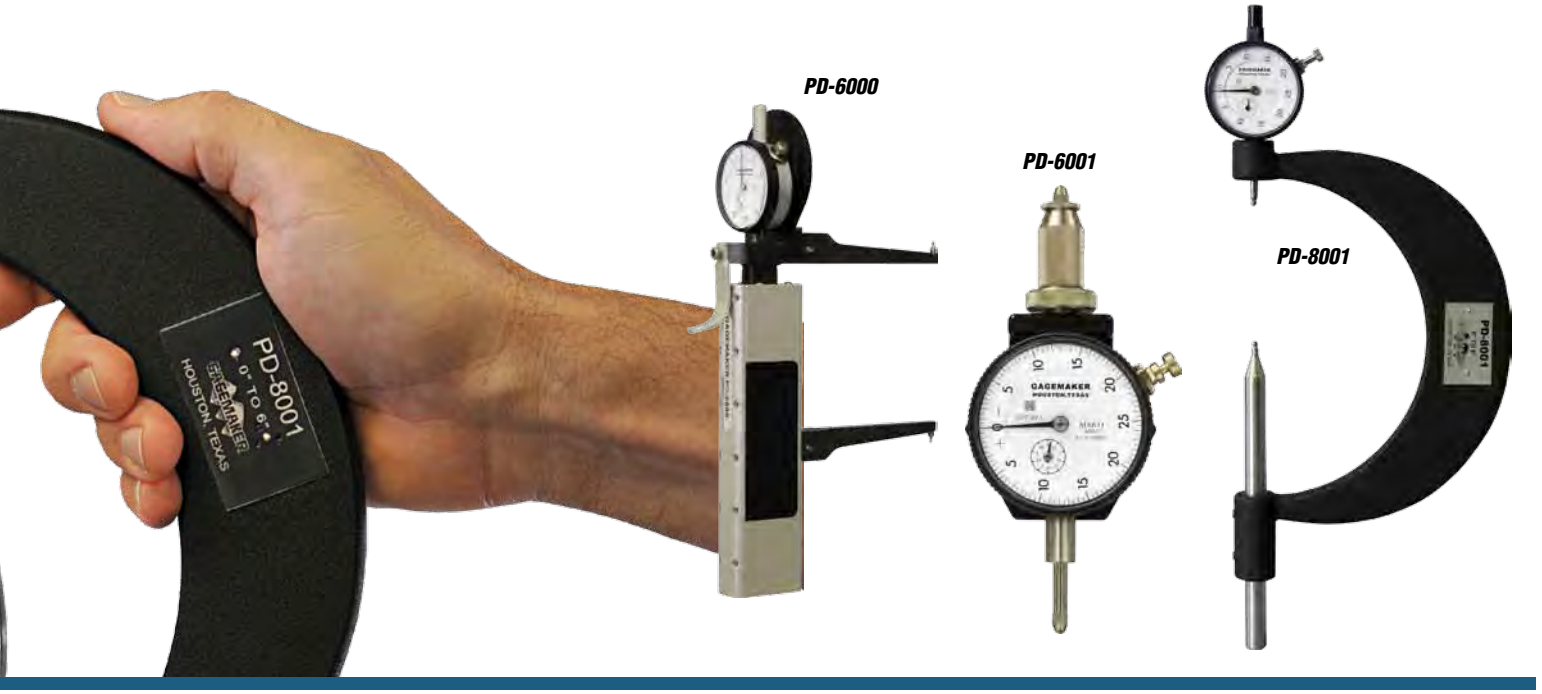
These inspection gages measure external thread pitch diameters. ***Software (see page 10) and contact points (see page 15 or 124-125) are sold separately***. For gages with ranges greater than 12", please see page 114. Higher resolution indicators are available.

| Model | Description | Range | Resolution | Travel |
|---|---|---|---|---|
| PD-8001 | External Ball Pitch Diameter Gage | 0" - 6" (0 mm - 152.4 mm) | .0005" | ½" |
| PD-8002 | External Ball Pitch Diameter Gage | 6" - 12" (152.4 mm - 304.8 mm) | .0005" | ½" |

## Internal Pitch Diameter Gages (1½" to 24" Diameters)

These inspection gages measure internal thread pitch diameters. ***Software (see page 10) and contact points (see page 15 or 124-125) are sold separately***. Higher resolution indicators are available.

| Model | Description | Range | Resolution | Travel |
|---|---|---|---|---|
| PD-6000 | Internal Pitch Diameter Gage ("V" & Acme) | 1½" - 9" (38.1 mm -228.6 mm) | .0005" | ½" |
| PD-6001 | Internal Pitch Diameter Gage | 6" - 24" (152.4 mm - 609.6mm) | .0005" | ½" |




## Contact Points

### UN Series (60° "V") Threads

These contacts points are used to inspect the pitch diameter of machined parts with 60° "V" thread forms. Two are required per gage. Sold individually.

| Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch |
|---|---|---|---|---|---|---|---|
| T562 | 1 | T128 | 4.5 | T072 | 8 | T032 | 18 |
| T288 | 2 | T115 | 5 | T057 | 10 | | |
| T188 | 3 & 3½ | T105 | 5½ | T050 | 11½ & 12 | | |
| T144 | 4 | T096 | 6 | T041 | 14 & 16 | | |

### Acme or Stub Acme Threads

These truncated contact points are used to inspect the pitch diameter of machined parts with 29° Acme and Stub Acme thread forms. Two are required per gage. Sold individually.

| Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch |
|---|---|---|---|---|---|---|---|
| T531T | 1 | T188T | 3 | T090T | 6 & 7 | T032T | 16 |
| T344T | 1½ | T144T | 3½ | T062T | 8 | | |
| T266T | 2 | T128T | 4 | T050T | 10 | | |
| T219T | 2½ | T105T | 5 | T041T | 12 & 14 | | |

### 7° x 45° Buttress Series Contact Points

These contact points are used to inspect the pitch diameter of machined parts with 7° x 45° Buttress thread forms. Two are required per gage. Sold individually.

| Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch |
|---|---|---|---|---|---|---|---|
| T562 | 1 | T219 | 2½ | T115 | 5 | T050 | 12 |
| T437 | 1¼ | T188 | 3 | T096 | 6 | T032 | 16 & 18 |
| T375 | 1½ | T156 | 3½ | T072 | 8 | | |
| T281 | 2 | T144 | 4 | T057 | 10 | | |

*For Trapezoidial or ISO Metric contact points please see pages 125.*

# Thread Lead Inspection

Thread lead is one of the most important thread elements and directly affects a part's functional size.

Lead error is most commonly generated by manual and CNC lathes not cutting properly. Therefore, it's important to take measurements at the locations where the most lead error typically occurs. These readings help detect machine tool error and worn lead screws on your lathe.

Lead gages inspect both internal and external lead on a variety of thread forms.

## Lead Gages

The **LG-5002** uses a two-point system to inspect thread lead for Acme, Stub Acme, Stub Acme Modified I and II, Metric M & J, UN, UNJ, UNR, 7º X 45º Buttress, and general purpose pipe threads. The two points allow for a sweeping action to obtain the measurement.

Before inspecting parts, the lead gage must be preset to a nominal predetermined dimension using a lead gage setting standard. See chart below for the proper standard based on pitch.

Contact points are sold separately. See page 17 or 124-125 for more.

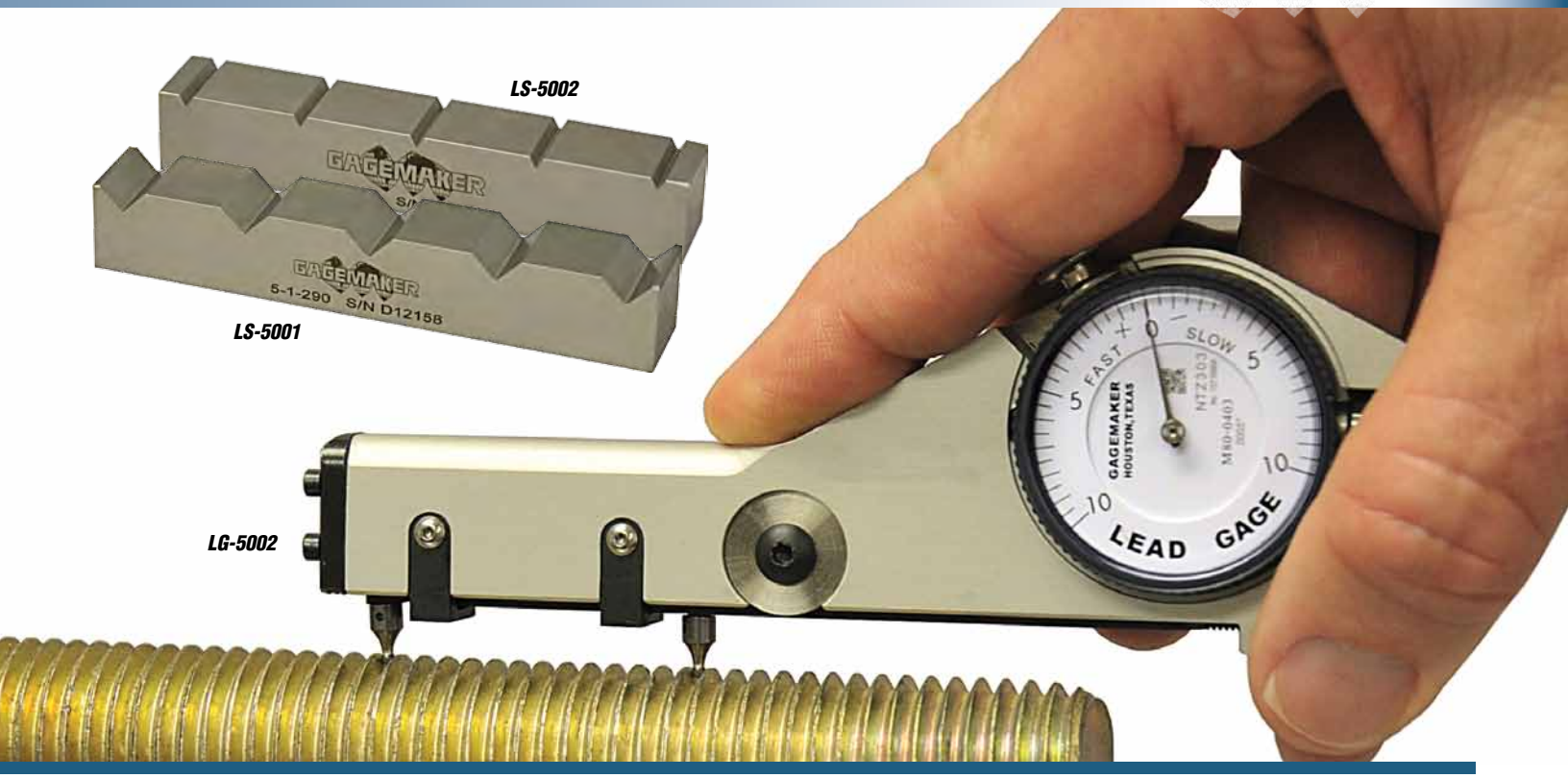
Higher resolution indicators are also available.

| Model | Description | Minimum Bore | Range |
|---|---|---|---|
| LG-5002 | 2-point Lead Gage | 1.200 | ½" - 4" (12.7mm - 101.6mm)Thread Length |

## Lead Gage Setting Standards

Gagemaker's precision lead gage setting standards are manufactured in accordance with ANSI Specifications. Lead gage standards are used to set the gage prior to the inspection.

| Model | Connection Type/Description | Threads Per Inch (TPI) |
|---|---|---|
| LS-5001 | Straight Threads, 1-5 pitch, 4" length | 1 - 5 |
| LS-5002 | Straight Threads, 6-18 pitch, 4" length | 6 - 18 |
| LS-___mm | Straight Threads, Metric, specify pitch for model (e.g. LS-4mm) | |




## Contact Points

### UN Series (60° "V") Threads

These contacts points are used to inspect the lead of machined parts with 60° "V" thread forms. Two are required per gage. Sold individually.

| Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch |
|---|---|---|---|---|---|---|---|
| T562 | 1 | T128 | 4.5 | T072 | 8 | T032 | 18 |
| T288 | 2 | T115 | 5 | T057 | 10 | | |
| T188 | 3 & 3½ | T105 | 5½ | T050 | 11½ & 12 | | |
| T144 | 4 | T096 | 6 | T041 | 14 & 16 | | |

### Acme or Stub Acme Threads

These truncated contact points are used to inspect the lead of machined parts with 29° Acme and Stub Acme thread forms. Two are required per gage. Sold individually.

| Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch |
|---|---|---|---|---|---|---|---|
| T531T | 1 | T188T | 3 | T090T | 6 & 7 | T032T | 16 |
| T344T | 1½ | T144T | 3½ | T062T | 8 | | |
| T266T | 2 | T128T | 4 | T050T | 10 | | |
| T219T | 2½ | T105T | 5 | T041T | 12 & 14 | | |

### 7° x 45° Buttress Series Contact Points

These contact points are used to inspect the lead of machined parts with 7° x 45° Buttress thread forms. Two are required per gage. Sold individually.

| Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch | Model | Thread Pitch |
|---|---|---|---|---|---|---|---|
| T562 | 1 | T219 | 2½ | T115 | 5 | T050 | 12 |
| T437 | 1¼ | T188 | 3 | T096 | 6 | T032 | 16 & 18 |
| T375 | 1½ | T156 | 3½ | T072 | 8 | | |
| T281 | 2 | T144 | 4 | T057 | 10 | | |

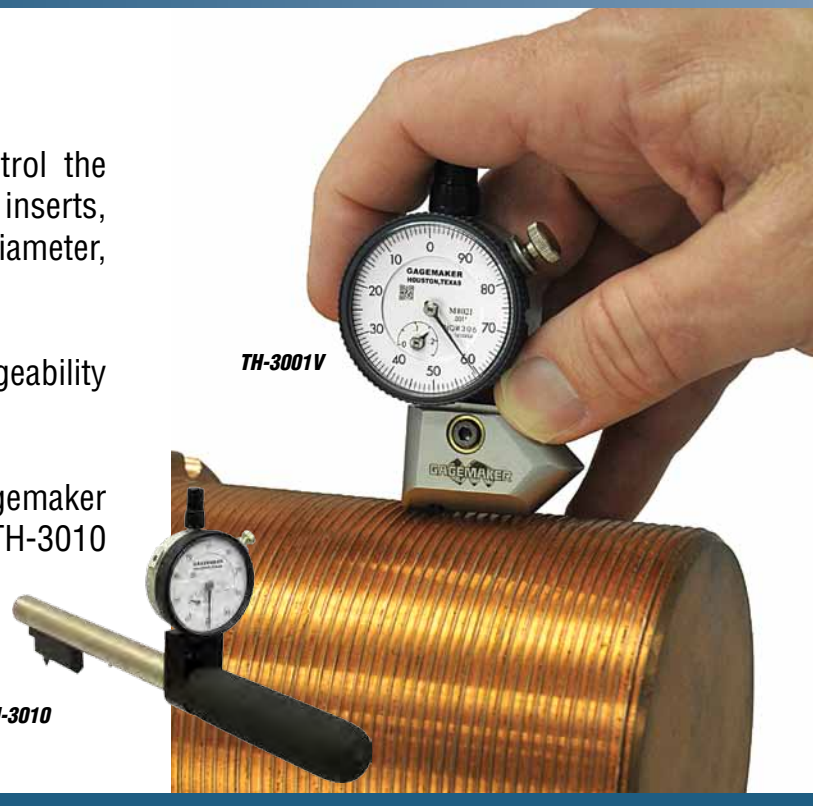
*For Trapezoidial or ISO Metric contact points please see pages 125.*

# Thread Height Inspection

Measuring thread height helps monitor and control the depth of cut during manufacturing, detects broken inserts, and can be used to calculate the minor or major diameter, when only one is known.

Accurate thread height contributes to the interchangeability and integrity of the threaded assembly.

For inspecting your straight thread heights, Gagemaker recommends our TH-3001V (external) and TH-3010 (internal) .




## External Thread Height Gages

Gagemaker manufactures many models of external thread height gages. Specify the type of thread when ordering. The T500C contact point is included. See contact point pages on 123-125 for other options.

| Model | Description | Travel | Min. Bore |
|---|---|---|---|
| TH-3001V | External Thread Height, 0-100 | .196" | 3.230" |

## Internal Thread Height Gages

Gagemaker also manufactures several models of internal thread height gages. Please specify the type of thread when ordering. The T500C contact point is included. See contact point pages on 123-125 for other options.

| Model | Description | Travel | Min. Bore |
|---|---|---|---|
| TH-3010 | Internal Thread Height, 0-100, 1" base | .250" | 1.750" |

# Thread Form Inspection

Check proper form and pitch by placing the correct profile template into the threads. By shining a light behind the profile template, it's possible to detect any steps or signs of a chipped insert. A template that stands too far out of the threads or allows excess light to shine through can be an indication of lead error. Sweeping the profile template along the helix of the threads helps find burrs or debris.

***Thread Profile***

## *Thread Form Profiles*

Gagemaker manufactures precision straight thread profile gages for the quick identification of product thread forms. Specify the pitch of the thread to be inspected when ordering. Special form profiles are available and are quoted upon request.

| Model | Description |
|---|---|
| TP-UNVI-__P | Internal UN series thread gage |
| TP-UNVE-__P | External UN series thread gage |
| TP-GPA-__P | Internal/external general purpose Acme thread profile gage |
| TP-SA-__P | Internal/external Stub Acme thread profile gage |
| TP-SAM1-__P | Modified 1 Stub Acme thread profile gage |
| TP-SAM2-__P | Modified 2 Stub Acme thread profile gage |
| TP-MI-__P | Internal ISO Metric series thread profile gage |
| TP-ME-__P | External ISO Metric series thread profile gage |
| TP-745-__P | Internal/External 7° X 45° Buttress thread profiile gage |

***Order Example:*** TP-UNVI-2P, TP-UNVE-4P, TP-SA-8P, etc.

Overlays for all of these profile gages are available.