

**ROTARY  
SHOULDERED  
CONNECTION  
GAGES**





## Joint Strength System Solutions

### Inspect the following Connections:

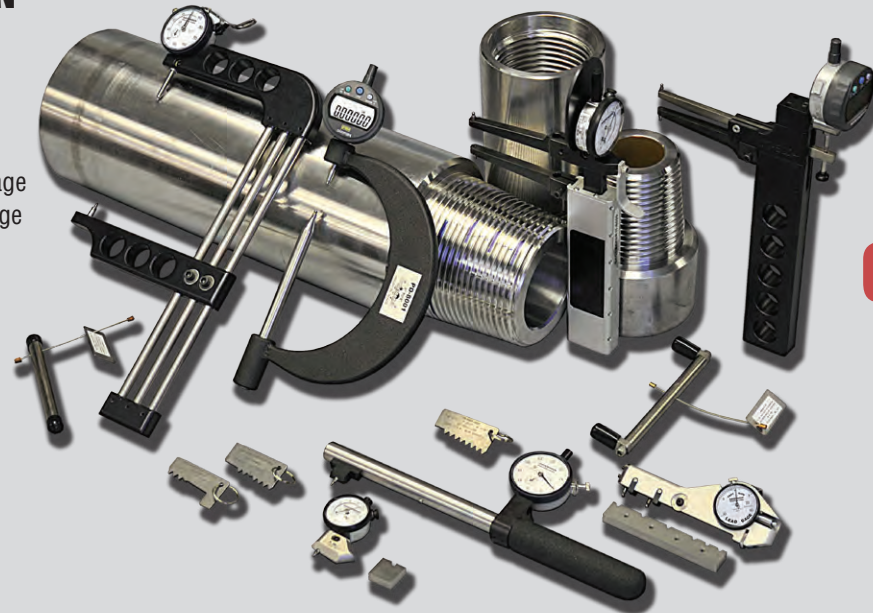
- API No. Connection (NC) - 23, 26, 31, 35, 38, 40, 44, 46, 50
- Double Streamline - 3½", 4, 4½", 5½"
- External Flush - 3½", 4½"
- Full Hole - 4"
- Internal Flush - 2¾", 2⅞", 3½", 4, 4½"
- Slim Hole - 2¾", 2⅞", 3½", 4, 4½"
- Xtra Hole - 2⅞", 3½", 4½", 5"

### FIELD SOLUTION JSS-100

#### Field Solution Includes:

- External pitch diameter gage
- Internal pitch diameter gage
- Location profiles for box
- Location profile for pin
- Lead gage and standard
- External taper gage
- Internal taper gage
- Thread height gages and standard
- Thread profiles
- TDWIN Taper Software
- 1 external rod standard\*
- 1 internal rod standard\*
- Necessary contact points

\*Field Solution includes one pin and one box standard for one connection size.  
Rod standards for additional connection sizes are available at solution price at time of package order.



### Choose Your

### Base Package:

### SHOP SOLUTION JSS-500

#### Shop Solution Includes:

- External pitch diameter gage
- Internal pitch diameter gage
- Location profile for box
- Location profile for pin
- Lead gage and standard
- External taper gage
- Internal taper gage
- Thread height gage and standard
- Thread profiles
- TDWIN Taper software
- MIC TRAC (MT-3000)
- Necessary contact points



# OR

### For Additional Connections,

### Choose Your Add-ons:

Connections										
IF - 5½", 6¾"	EF - 2¾", 2⅞"	FH - 2⅞", 3½", 4½" REG - 2¾", 2⅞", 3½", 4½"	REG - 5½", 7¾", 8¾"	FH - 5½", 6¾" REG - 6¾"	H - 90 - 3½", 4", 4½", 5", 5½", 6¾"	H - 90 - 7", 7¾", 8¾"	SL H-90 - 2¾", 2⅞", 3½"	NC - 10, 12, 13, 16 REG - 1", 1½"	NC - 56, 61, 70, 77	PAC - 2¾", 2⅞", 3½" OH - 2¾", 2⅞", 3½", 4", 4½"
JSS-100 Field Solution Add-ons										
JSS-100-1A 	JSS-100-2A 	JSS-100-3A 	JSS-100-4A 	JSS-100-5A 	JSS-100-6A 	JSS-100-7A 	JSS-100-8A 	JSS-100-9A 	JSS-100-10A 	JSS-100-11A 
JSS-500 Shop Solution Add-ons										
JSS-500-1A 	JSS-500-2A 	JSS-500-3A 	JSS-500-4A 	JSS-500-5A 	JSS-500-6A 	JSS-500-7A 	JSS-500-8A 	JSS-500-9A 	JSS-500-10A 	JSS-500-11A 





## Rotary Shouldered Connection Thread Inspection System

Gagemaker's Joint Strength System (JSS™) is a revolutionary breakthrough in accurately gauging the quality of both *new* and *used* rotary shouldered connections. It's now possible to avoid broken connections by identifying thread damage before it's visually apparent and unfortunately too late. For years, the industry has relied on the interpretative "fit" of a ring or plug gage although a ring or plug gage will not directly detect variation in pitch diameter. With JSS™, you'll inspect just a few key attributes and save hours of down time and thousands of dollars in rework charges.



### Inspection Setup and Tolerances



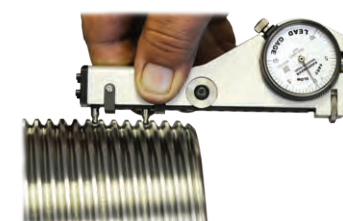
### Insert Identification



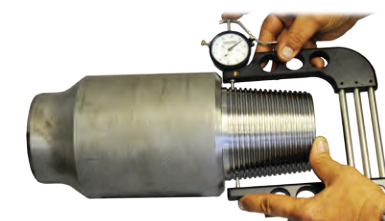
### Thread Form



### Pitch Diameter



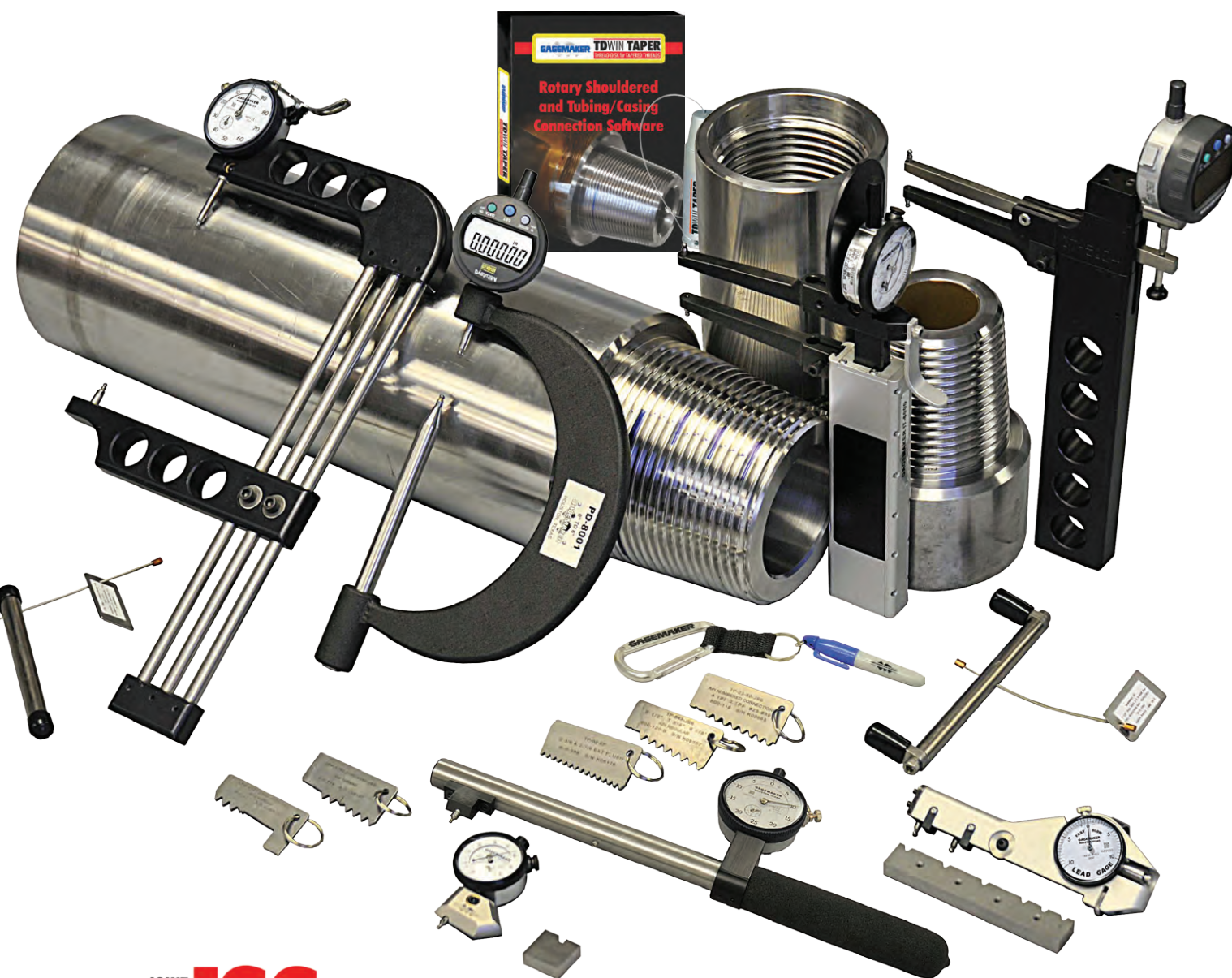
### Thread Lead



### Thread Taper



### Thread Height







## Inspection Setup and Tolerances

TDWIN Taper is the only software program dedicated to the manufacturing and inspection of downhole tubular connections. It has everything you need to machine, inspect, and document tubular connection threads. TDWIN Taper relies on API and industry standard tables and tolerances. TDWIN Taper displays connection drawings, inspection gage information, and setup and inspection reports. Simply, it is a must have for any machine shop.

TDWIN Taper is included in any full JSS Package.

- Follows API Specification 7-2, Dec. 2008, for Rotary Shouldered Connections and API Specification 5B, Oct. 2008, for Tubing and Casing Connections
- Print product blueprints for manufacturing and inspection
- Print dimensional reports and inspection sheets
- Provides gages configurations, setting standards, and contact point information



## TDWIN TAPER THREAD DISK for TAPERED THREADS



The program includes the following tapered connections:

### Tubing and Casing Connections

- |                     |                                 |
|---------------------|---------------------------------|
| NUE Tubing          | USS Improved Buttress Tubing    |
| EUE Tubing          | Line Pipe                       |
| Short Thread Casing | Special Clearance Couplings     |
| Long Thread Casing  | SR13 Seal Ring Groove Couplings |
| Buttress Casing     |                                 |

### Rotary Shouldered Connections

- |                               |                  |                         |
|-------------------------------|------------------|-------------------------|
| API Numbered Connections - NC | PAC              | Slimline H-90 - SL H-90 |
| API Regular - REG             | Slim Hole - SH   | External Flush - EF     |
| Full Hole - FH                | Wide Open - WO   | Acme Regular - AR       |
| Internal Flush - IF           | Xtra Hole - XH   | Acme Streamline - AS    |
| Open Hole - OH                | Hughes 90 - H-90 | Double Streamline - DSL |

### System Requirements

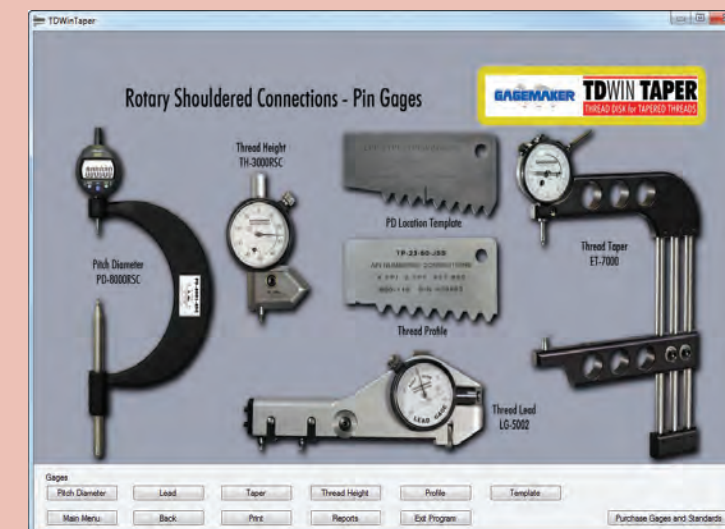
- Microsoft Windows XP or newer
- USB 2.0 port
- Internet Connection for first use
- 1 MB RAM or more (recommended)
- Screen resolution of 1024 X 768 minimum
- .Net Framework 2.0 or later installed

Model	Description
TDWIN-Taper	Thread Disk Software for Tapered Threads
TDWIN-Taper-Network	Multi-user license agreement

The oilfield's most reliable source of information to accurately machine, inspect, and document tapered threaded connections

Consulting TDWIN Taper should be your first step in quality assurance. Until now, this type of information was available only through closely controlled documents supplied by a few industry leaders. Now, all the latest dimensions, gauging tolerances, and inspection reports for the connections you need to cut are available with a few keystrokes.

Stay on top of the ongoing changes in industry specifications with your own copy of the TDWIN Taper program.







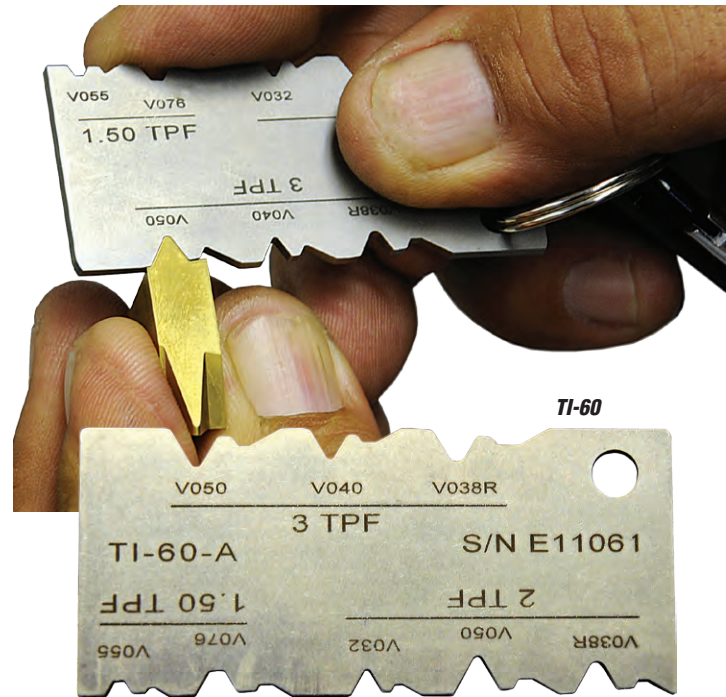
## Insert Identification

The first step in the quality process is to ensure the threading insert being used is correct for the job.

Use a Thread Insert Identifier Template to quickly verify that the correct threading insert has been selected as well as check the full topping profile of both internal and external inserts.

A quick mating of the insert to the template ensures the insert is correct for the job.

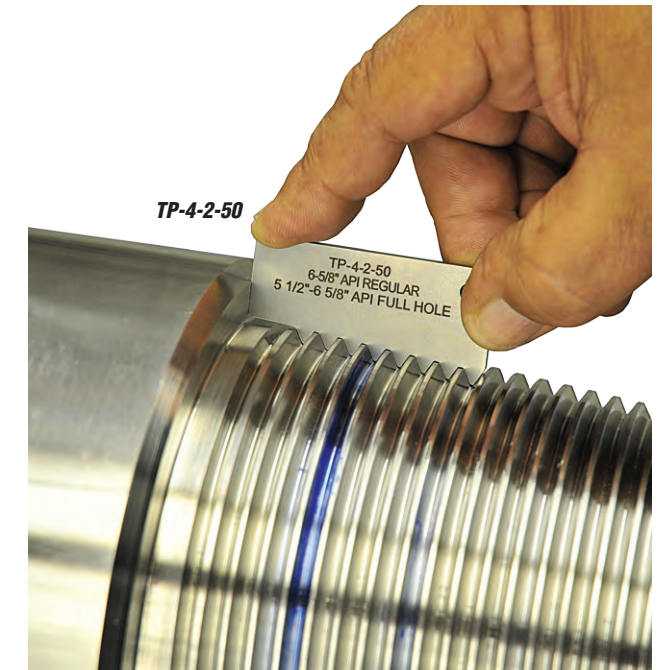
Insert identifiers have multiple notches on each template and are available for all API thread forms.



## Thread Form Inspection

Thread form accuracy is important if two connections are to make-up properly. Using a Thread Profile Gage provides a quick check of the thread to ensure that the form is correct. The Thread Profile should be used on every connection to ensure the first imperfect thread was deburred fully.

Thread form is defined as its profile in an axial plane for a length of one pitch. Most importantly, verifying thread form is a recommended inspection for API connections and ensures form accuracy.



## Tapered Insert Identifiers

Gagemaker's new tapered thread insert identifier easily determines which threading insert the machinist is using. When an optical comparator is unavailable, the insert identifier will show which thread form is on the insert.

Model	TPF	Thread Forms
TI-RSC-60	1.5", 2", & 3"	V-0.032, V-0.038R, V-0.040, V-0.050, V-0.055, V-0.076
TI-RSC-90	1.25", 2", 3", & 3.373"	A-0.094, 90-V-0.050, 90-V-0.084

## Thread Profile Gages

Gagemaker manufactures precision tapered thread profile gages for the quick identification of product thread forms. Specify the connection which is to be inspected when ordering. Special profiles will be quoted upon request.

Model	Connection Type	TPI, TPF, Thread Form
TP-3-1.25-84	2 $\frac{3}{8}$ " - 3 $\frac{1}{2}$ " Hughes Slimline H-90	3 TPI, 1.25" TPF, 90-V-0.084
TP-3.5-2-50	3 $\frac{1}{2}$ " - 6 $\frac{5}{8}$ " Hughes H-90	3.5 TPI, 2" TPF, 90-V-0.050
TP-3.5-3-50	7" - 8 $\frac{5}{8}$ " Hughes H-90	3.5 TPI, 3" TPF, 90-V-0.050
TP-4-1.5-76	2 $\frac{3}{8}$ " - 3 $\frac{1}{2}$ " P.A.C. Connections 2 $\frac{3}{8}$ " - 4 $\frac{1}{2}$ " American Open Hole	4 TPI, 1.5" TPF, V-0.076
TP-4-2-50	6 $\frac{5}{8}$ " API REG 5 $\frac{1}{2}$ " & 6 $\frac{5}{8}$ " API Full Hole	4 TPI, 2" TPF, V-0.050
TP-4-2-38	3 $\frac{1}{2}$ " - 5 $\frac{1}{2}$ " Double Streamline, 3 $\frac{1}{2}$ " - 4 $\frac{1}{2}$ " External Flush, 4" API Full Hole, 2 $\frac{3}{8}$ " - 4 $\frac{1}{2}$ " Hughes Slim Hole, 2 $\frac{3}{8}$ " - 5" Hughes Xtra Hole, 2 $\frac{3}{8}$ " - 6 $\frac{5}{8}$ " Internal Flush 2 $\frac{3}{8}$ " - 4 $\frac{1}{2}$ " Wide Open API Numbered Connections #23 - #50	4 TPI, 2" TPF, V-0.038R
TP-4-3-38	API Numbered Connections #56 - #77	4 TPI, 3" TPF, V-0.038R
TP-4-3-50	5 $\frac{1}{2}$ ", 7 $\frac{3}{8}$ ", & 8 $\frac{5}{8}$ " API REG	4 TPI, 3" TPF, V-0.050
TP-5-3-40	2 $\frac{3}{8}$ " - 4 $\frac{1}{2}$ " API REG 2 $\frac{3}{8}$ ", 3 $\frac{1}{2}$ ", 4 $\frac{1}{2}$ " API Full Hole	5 TPI, 3" TPF, V-0.040
TP-6-1.5-55	API Numbered Connections #10, #12, #13, #16 M.T. (Macaroni Tubing)	6 TPI, 1.5" TPF, V-0.055
TP-6-2-32	2 $\frac{3}{8}$ " - 2 $\frac{1}{8}$ " Hughes External Flush	6 TPI, 2" TPF, V-0.032

Special profiles and overlay charts are available. For information on those available, please contact customer service. For Special Overlays, please specify the following: 1. Screen Size, 2. Magnification 20X/50X, and 3. Product Form or Profile Template

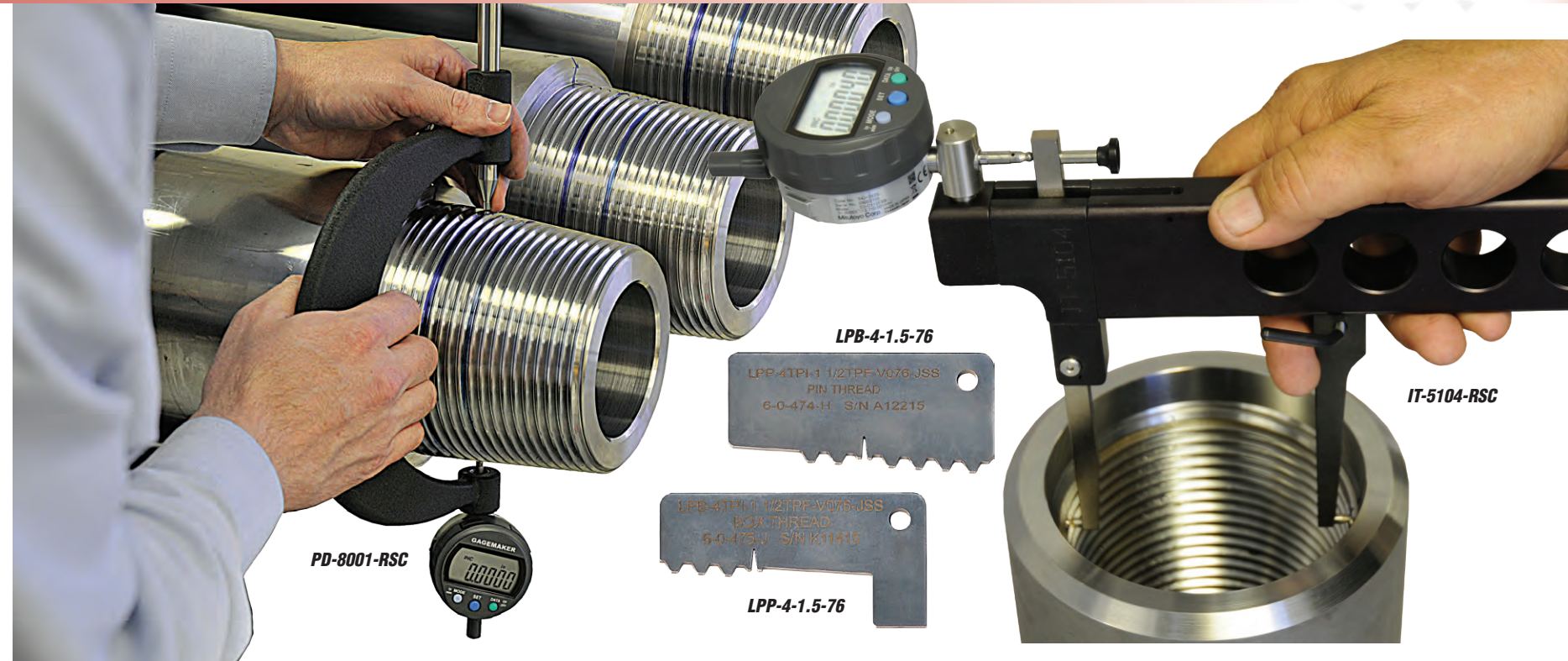




## Thread Pitch Diameter Inspection

Now, operators are able to inspect both new and used pipe threads using precision Pitch Diameter Gages that allow them to pinpoint early signs of stress, perform preventative maintenance, and extend the life of their drill string connections. By measuring the pitch diameters, the operators can directly control the connection's size during manufacturing, as well as ensure that the thread cones go into interference properly when the connections are torqued together.

In the past, pitch diameter has been ignored as long as the ring or plug gage threaded to an acceptable standoff. Using a pin location profile (LPP) and a PD-8000-RSC Series gage(pin) or a box location profile (LPB) with an IT-5104-RSC (box) provides you plenty of control. The process of locating and measuring the pitch diameter takes less than a minute. This minute of inspection quickly decides the difference between good quality and bad quality.



### Pitch Diameter Location Templates

Pitch diameter location templates locate the point on the connection where the pitch diameter is measured. When applied properly to the connection, the template's special layout mark indicates the proper thread to measure the pitch diameter. A simple mark with a felt tip marking pen allows the operator or inspector to accurately position the gage and read a diameter. Please specify the threads per inch ( TPI), taper per foot (TPF), and thread form when ordering.

### Box Pitch Diameter Location Templates

Model	Thread Form	Model	Thread Form
LPB-3-1.25-SLH9	3 TPI, 1.25 TPF, 90-V-0.084	LPB-4-3-50	4 TPI, 3 TPF, V-0.050
LPB-3.5-2-H9	3.5 TPI, 2 TPF, 90-V-0.050	LPB-4-3.375-A-0.094	4 TPI, 3.375 TPF, A-0.094
LPB-3.5-3-H9	3.5 TPI, 3 TPF, 90-V-0.050	LPB-5-3-40	5 TPI, 3 TPF, V-0.040
LPB-4-1.5-76	4 TPI, 1.50 TPF, V-0.076	LPB-6-1.0-55	6 TPI, 1.0 TPF, V-0.055
LPB-4-2-38	4 TPI, 2 TPF, V-0.038R	LPB-6-1.5-55	6 TPI, 1.50 TPF, V-0.055
LPB-4-2-50	4 TPI, 2 TPF, V-0.050	LPB-6-2-32	6 TPI, 2 TPF, V-0.032
LPB-4-3-38	4 TPI, 3 TPF, V-0.038		

### Pin Pitch Diameter Location Templates

Model	Thread Form	Model	Thread Form
LPP-3-1.25-SLH9	3 TPI, 1.25 TPF, 90-V-0.084	LPP-4-3-50	4 TPI, 3 TPF, V-0.050
LPP-3.5-2-H9	3.5 TPI, 2 TPF, 90-V-0.050	LPP-4-3.375-A-0.094	4 TPI, 3.375 TPF, A-0.094
LPP-3.5-3-H9	3.5 TPI, 3 TPF, 90-V-0.050	LPP-5-3-40	5 TPI, 3 TPF, V-0.040
LPP-4-1.5-76	4 TPI, 1.50 TPF, V-0.076	LPP-6-1.0-55	6 TPI, 1.0 TPF, V-0.055
LPP-4-2-38	4 TPI, 2 TPF, V-0.038R	LPP-6-1.5-55	6 TPI, 1.50 TPF, V-0.055
LPP-4-2-50	4 TPI, 2 TPF, V-0.050	LPP-6-2-32	6 TPI, 2 TPF, V-0.032
LPP-4-3-38	4 TPI, 3 TPF, V-0.038		

### Internal Pitch Diameter Gages

Gagemaker's internal pitch diameter gages measure variation in internal thread pitch diameters. Pitch diameter gages are shipped with one set of contact points, please see the chart below to request proper points. Setting dimensions for the pitch diameter gages are provided by the TDWIN TAPER software package. Gages require setting with either a standard or a MIC TRAC. **Software (page 42), MIC TRAC (pages 87-93), contact points, and standards (page 113) are sold separately.**

Model	Description	Range
IT-5104-RSC	Internal Pitch Diameter Gage	4" (101.6 mm) Depth, 1½" - 10" (38.1 mm - 254 mm) Diameter

### External Pitch Diameter Inspection Gages

The ball pitch diameter gages indicate the pitch diameter size of the product's external thread. The gages are adjustable within a size range and use interchangeable contact points to measure different pitch threads. Gages ship with one set of contact points, please see the chart below to request proper points. Gages require setting with either a standard or a MIC TRAC. **Software (page 42), MIC TRAC (pages 87-93), contact points, and standards (page 113) are sold separately.**

Model	Description	Range
PD-8001-RSC	External Pitch Diameter Gage	0" - 6" (0 mm - 152.4 mm)
PD-8002-RSC	External Pitch Diameter Gage	6" - 12" (152.4 mm - 304.8 mm)

### API Contact Points for Pitch Diameter Gages

Gagemaker's standard ball contact points are manufactured with carbide balls. All RSC inspection gages use threaded shank contact points. Threaded shanks are #4-48 UNF. Pitch diameter gages require two contact points. Sold individually.

Model	Point Diameter	Threads Per Inch	Connection Type
T235	0.235"	3	Hughes Slim Line H-90
T200	0.200"	3½	All Hughes H-90
T144	0.144"	4	API Rotary Shouldered Connections
T115	0.115"	5	API Rotary Shouldered Connections
T096	0.096"	6	API Rotary Shouldered Connections





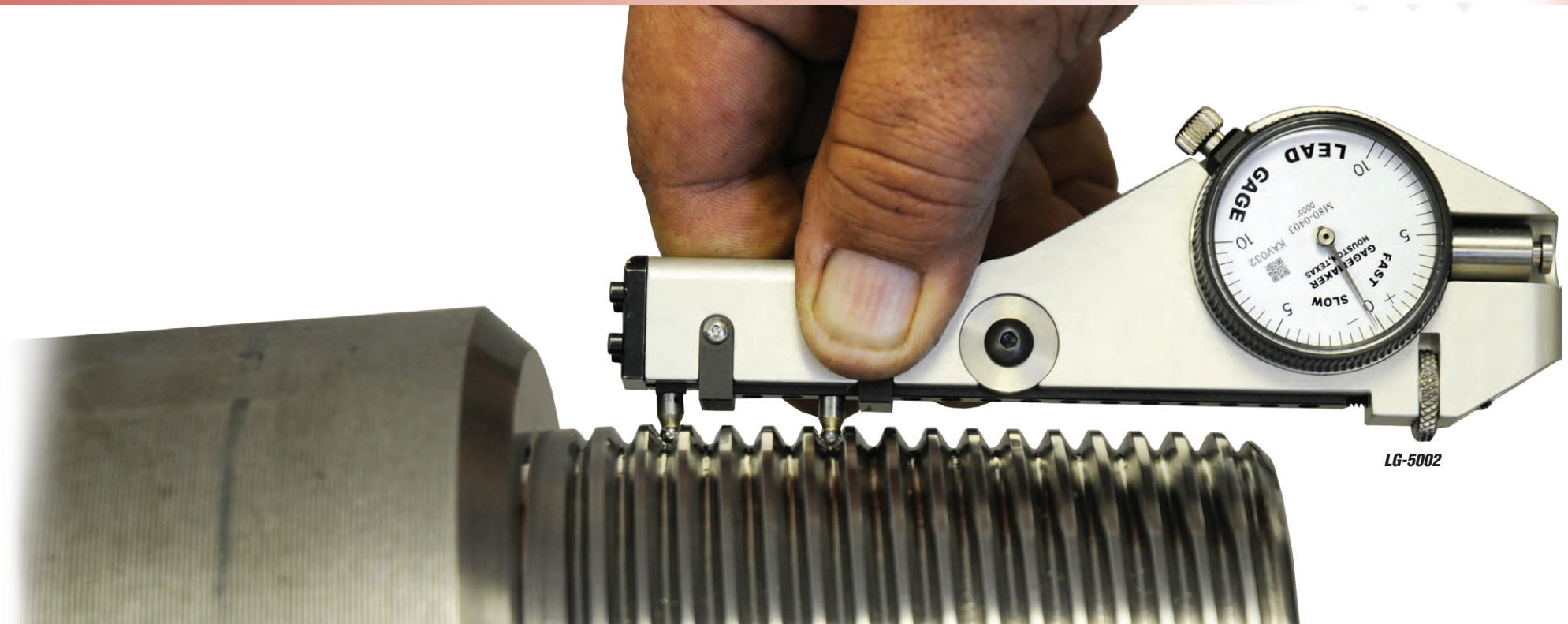
## Thread Lead Inspection

Thread Lead is one of the most important thread elements to monitor. Not only is lead inspection an industry wide practice for rotary shouldered connections, it is an API Specification 7 mandated requirement. Lead error is most commonly generated by manual and CNC lathes not cutting properly.

Thread lead is the distance between threads, measured on a plane parallel to the centerline of the threaded part. Lead error has a direct effect on functional diameter, stand-off, and thread flank engagement.

Gagemaker's lead gages inspect pin and box connections for multiple pitches and thread forms. The gages provide dimensional verification of product print data on the thread's true integrity.

- Interchangeable contact points allow inspection on a variety of thread forms.
- Inspect RSC threads as well as Tubing and Casing threads.
- Requires presetting using Gagemaker's lead gage setting standards.



## Lead Gages

The **LG-5002** is a two-point gage for inspecting thread lead for API threads. The two points allow for a sweeping action to obtain the measurement.

The **LG-5003** is a three-point gage for inspecting thread lead on API threads. Two fixed contact points at the rear of the gage and one moveable contact point at the front of the gage provide complete stability when taking thread lead measurements. This unique design does not require sweeping to obtain measurements.

Contact points can be easily changed to allow the gage to be used on a variety of thread forms. Lead gages come with two contact points. Please specify type of points required when ordering, see page 44 for chart.

Before inspecting parts, the lead gage must be preset to a nominal predetermined dimension using a lead gage setting standard. Please see the chart on page 44 to select your standard. Standards are not included.

Model	Description	Minimum Bore	Range
LG-5002	2-point Lead Gage	1.200	1/2" - 4" Thread Length
LG-5003	3-point Lead Gage	1.340	1/2" - 4" Thread Length

## Lead Gage Setting Standards

Gagemaker's precision lead gage setting standards are manufactured in accordance with API Specification 7-2. Lead gage standards are used to set the gage prior to the inspection.

Model	Connection Type/Description	TPF*	TPI*
LS-1007	6 5/8" API Reg; 4", 5 1/2", & 6 5/8" API Full Hole; 2 7/8", 3 1/2" - 5" Hughes Xtra Hole; 2 3/8", 2 7/8" - 4 1/2" Hughes Slim Hole; 2 3/8" - 5 1/2" API INT Flush; API Numbered Connections #23-#50	2"	4
LS-1008	5 1/2", 7 7/8" - 8 5/8" API Reg, API Numbered Connections #56 - #77	3"	4
LS-1009	2 3/8" - 4 1/2" API Reg, 3 1/2", 4 1/2" API Full Hole	3"	5
LS-1010	API Numbered Connections #10, #12, #13, #16 A.M.T. (Macaroni Tubing) 2 3/8" - 3 1/2" PAC 2 3/8" - 4" American Open Hole	1 1/2"	4
LS-1011	3 1/2" - 6 5/8" Hughes H-90	2"	3 1/2
LS-1012	7" - 8 5/8" Hughes H-90	3"	3 1/2
LS-1013	2 3/8" - 3 1/2" Slim Line H-90	1 1/4"	3

\*TPF = Taper Per Foot, TPI = Threads Per Inch

## API Contact Points for Lead Gages

Gagemaker's standard ball contact points are manufactured with carbide balls. All Gagemaker lead gages use threaded shank contact points. Threaded shanks are #4-48 UNF. Lead gages require two or three contact points. See pages 124-125 for additional contact points.

Model	Point Diameter	Threads Per Inch	Connection Type
T235	0.235"	3	Hughes Slim Line H-90
T200	0.200"	3 1/2	All Hughes H-90
T144	0.144"	4	API Rotary Shouldered Connections
T128	0.128"	4 1/2	API Rotary Shouldered Connections
T115	0.115"	5	API Rotary Shouldered Connections
T096	0.096"	6	API Rotary Shouldered Connections

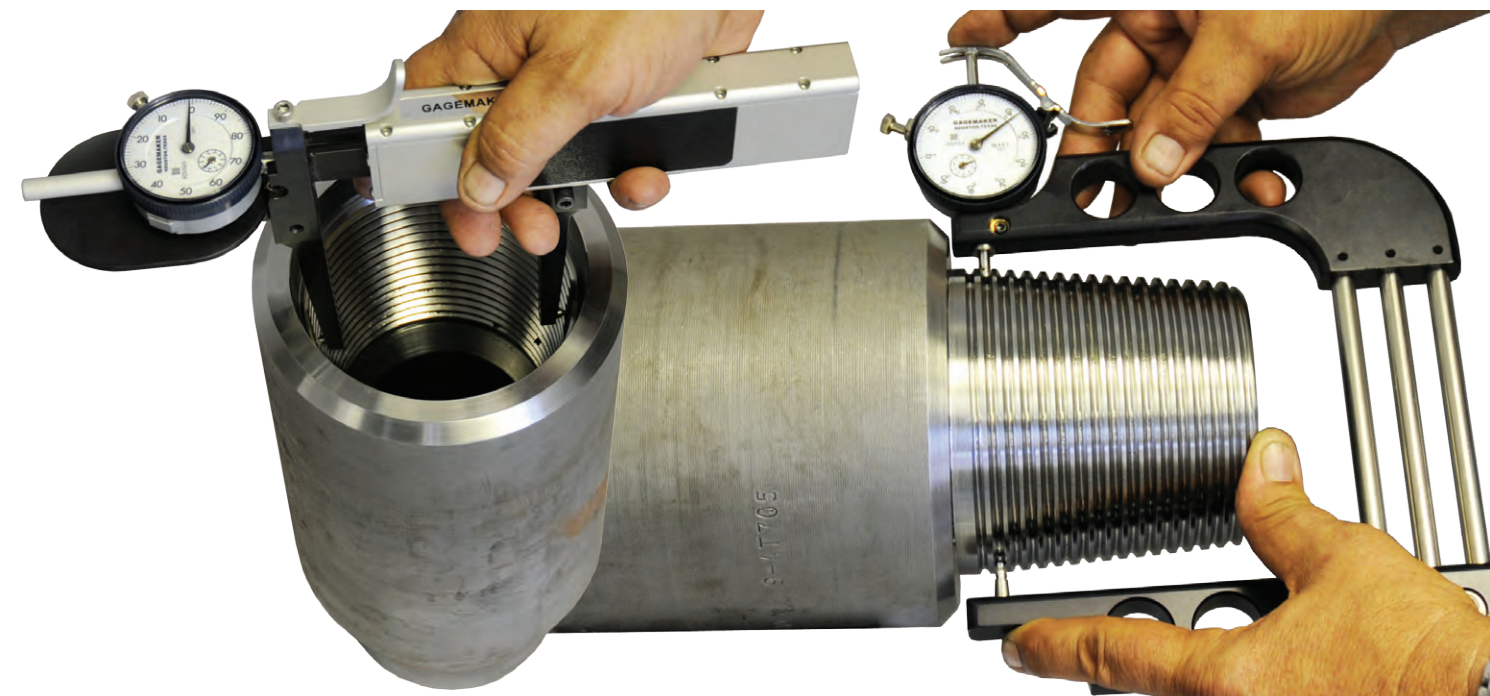
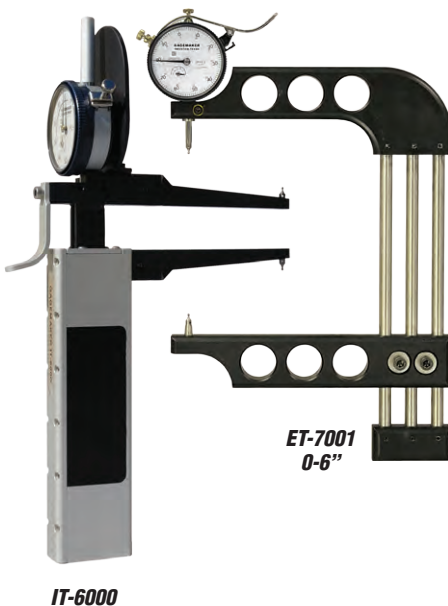


## Thread Taper Inspection

Thread Taper is the change in pitch diameter over the length of a connection, typically designated in inches per foot. For all rotary shouldered connections, measuring thread taper is not only an industry wide practice; it is an API mandated inspection.

During the manufacturing process, taper must be accurately measured and quantified to avoid mismatched tapers. When under a service load, mismatched tapers between pins and boxes diminish proper thread engagement resulting in reduced connection performance.

Gagemaker's IT-6000 and ET-7000 series gages are the best choice for measuring and controlling both pin and box taper values within the required specification limits. When RSC connections are properly manufactured utilizing Gagemakers precision taper gages, product performance is maximized.



### External Taper Gages

Gagemaker's external taper gages inspect variation in connection taper. External taper gages are shipped with .072" diameter contact points unless otherwise requested. Refer to the contact point chart on the next page for the proper contact point for your particular connection. Higher resolution indicators are available. For larger diameters, see page 115.

Model	Description	Range	Travel	Resolution
ET-7003	External Taper Gage	0" - 10"	1"	.001"

### Internal Taper Gages

Gagemaker's internal taper gages measure variation in connection taper. Taper gages are shipped with our standard set of .072" diameter contact points, unless specified otherwise. Refer to the contact point chart on the next page for the proper contact point for your particular connection. Higher resolution indicators are available. For larger diameters, see page 115.

Model	Description	Range	Travel	Resolution
IT-6000	Internal Taper Gage, 4¼" Depth	1½" - 9" Diameter	1"	.001"

### API Contact Points for Taper Gages

Gagemaker's standard contact points are manufactured with carbide balls. Taper gages use threaded shank contact points. Threaded shanks are #4-48 UNF. For other contact points, please see pages 124-125. Taper gages require two contact points. Sold individually.

Model	Point Diameter	Threads Per Inch (TPI)	Connection Type
T235	0.235"	3	Hughes Slim Line H-90
T200	0.200"	3½	All Hughes H-90
T144	0.144"	4	API Rotary Shouldered Connections
T115	0.115"	5	API Rotary Shouldered Connections
T096	0.096"	6	API Rotary Shouldered Connections





## Thread Height Inspection

Proper thread height maximizes the performance of any threaded connection and is a required inspection by the API. Thread height not only affects the interchangeability but also the integrity of a thread assembly. Thread height is the distance between the crest and the root, normal to the axis of the thread and several issues can be easily detected by simply inspecting thread height.

From detecting a chipped tool to preventing a connection from pulling apart under critical loads, inspecting thread height is valuable. Thread Height Gages inspect both internal and external thread height for a variety of thread forms and provide immediate feedback on the integrity of your threads.



### External Thread Height Gages

Gagemaker manufactures external thread height gages. Please specify the thread form when ordering. One contact point (T072) included, please see chart on page 53 for the proper point for your connection. Standards sold separately, please see page 53.

Model	Description	Connection	Travel	Min. Bore
TH-3000-RSC	External Thread Height, 0-25-0	Rotary Shouldered Connections	.196"	3.230"

### Internal Thread Height Gages

Gagemaker also manufactures internal thread height gages. Please specify the thread form when ordering. One contact point (T072) included, please see chart on page 53 for proper point for your connection. Standards sold separately, please see page 53.

Model	Description	Connection	Travel	Min. Bore
TH-3009-RSC	Internal Thread Height, 0-25-0, 1" Base	Rotary Shouldered Connections	.250"	1.750"

### Thread Height Gage Standards

Gagemaker manufactures precision setting standards for thread height gages to API specifications. Please specify the type of thread when ordering.

Model	Description
10322-RS	V-0.032, 2 TPF, 6 TPI to be used with T034 pt.
10382-RS	V-0.038, 2 TPF, 4 TPI to be used with T072 pt.
10383-RS	V-0.038, 3 TPF, 4 TPI to be used with T072 pt.
10403-RS	V-0.040, 3 TPF, 5 TPI to be used with T034 pt.
10502-RS	V-0.050, 2 TPF, 4 TPI to be used with T044 pt.
10503-RS	V-0.050, 3 TPF, 4 TPI to be used with T044 pt.
10551.5-RS	V-0.055, 1.5 TPF, 6 TPI to be used with T072 pt.
10761.5-RS	V-0.076, 1.5 TPF, 4 TPI to be used with T044 pt.
10H90-2	2" TPF H-90 Connection (90-V-0.050), 3.5 TPI to be used with T072 pt.
10H90-3	3" TPF H-90 Connection (90-V-0.050), 3.5 TPI to be used with T072 pt.
SL-H90	1¼" TPF, 3 TPI, 90-V-0.084 to be used with T072 pt.

### Thread Height Contact Points

Gagemaker's standard contact points are manufactured with carbide balls. Thread height gages require one contact point. Points are sold individually.

Model	Point Diameter	Threads Per Inch	Thread Form
T072	0.072"	3, 3.5, 4, 6	V-0.038R, V-0.055
T044	0.044"	4	V-0.050, V-0.076
T034	0.034"	5, 6	V-0.032, V-0.040