



HEMCO
The Longer Lasting Gage

GAGING CATALOG

QUALITY GAGES

HEMCO

The Longer Lasting Gage



SERVICES

GageSaver™ Service.....	2
Calibration.....	2
ASAP Service.....	3

MGI

Special Tooling.....	6
----------------------	---

THREADS

API - American Petroleum Institute Gages.....	5
Gage Tolerances	12
Thread Definitions.....	13
Taperlock Thread Plug Gages.....	15
Reversible Thread Plug Gages.....	16
STI - Screw Thread Plug Insert Gages.....	17
Thread Measuring Wires.....	17
Special Thread Gages.....	18
How to Set Thread Rings.....	19
Thread Rings & Set Plug Gages.....	20
Pipe Threads: General Purpose.....	21
Gages Recommended to Check Other Pipe Threads.....	22
Function & Use of Dryseal Gaging.....	23
NPTF Thread Gages.....	24
Standard Inch Pitch Diameters.....	25-26
Standard Metric Pitch Diameters.....	27
ANSI/ASME Thread Series Designations.....	28

CYLINDRICALS

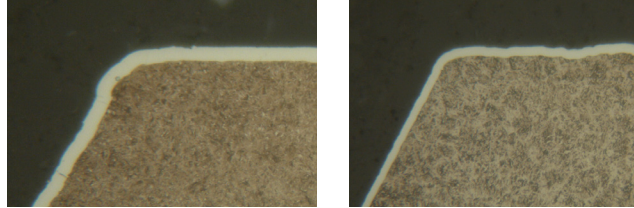
Reversible Cylindrical Plug Gages.....	8
Taperlock Cylindrical Plug Gages.....	9
Cylindrical Rings & Master Setting Rings.....	10
HEMCOChrome™ Pins & Master Setting Discs.....	11
Cylindrical Gage Tolerances.....	12

REFERENCE

HEMCOChrome™	1
Terms & Conditions.....	3
Quality & Accreditations.....	4
The Virtues of Limit Gaging Cylindrical.....	7
The Virtues of Limit Gaging Threads.....	14

The HEMCOChrome™ Difference:

Our gages are through-hardened & plated by our highly experienced Chromologists.
See the difference: Coating magnified 400x.

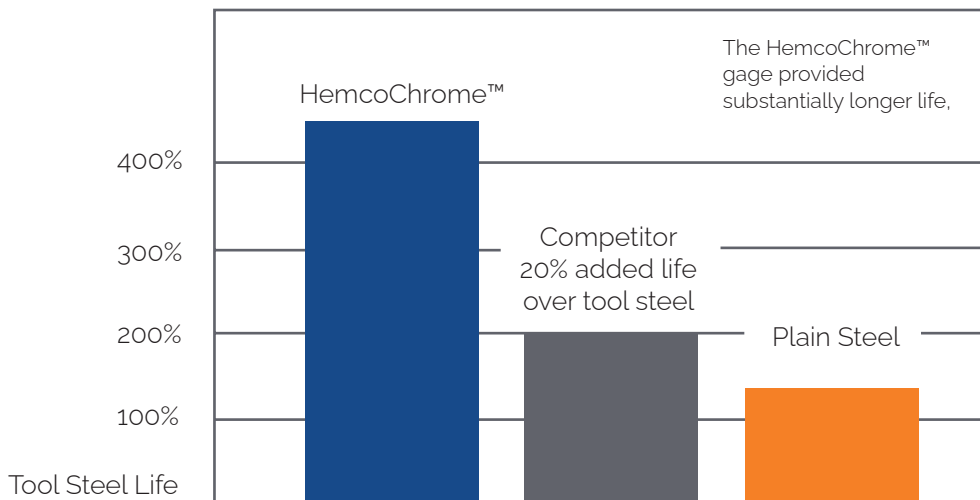


HEMCOChrome™ SAVES money because our gages last 3-5x longer than our competitors.

Hemco's unique difference is created by a talented team of experienced and caring people combined with:

- 0-1 Tool Steel through-hardened to 58-62 Rc then HEMCOChrome™ processed to 72 Rc.
- Every Hemco Gage is ground undersized, then Chrome plated to the high side of the tolerance.
- Chrome plating equipment designed & built by HEMCO specifically for tight tolerance gaging.
- Chrome Plating bath formulas improved with HEMCO's unique process.

You Benefit by Saving Money! In laboratory tests the HEMCOChrome™ gage outlasts the competitors plain steel gage or the competitors flash chrome gage: 4:1.



Testing Laboratory results indicate that the competitor chrome gage provided 20% longer life over an unplated hardened tool steel gage.

Tested using 1/2-13 UNC Go Plugs.

When you use The Longer Lasting HemcoChrome™ Gage you receive other Cash Saving Benefits:

Saves You Money When You Reorder!

If possible, the GageSaver™ program will rework worn gages to like-new through the application of HEMCO's unique chrome process, or replace them with with new gages at the reduced price of 10% off.

Saves Calibration Costs!

They do not have to be calibrated as often.

Saves on Overhead Costs!

They do not have to be ordered as often saving requisition and purchase order costs.

Does Gage Calibration Frustrate you?

Turn around too long?

Costs too high ?

Inconvenienced replacing worn-out gages?

Let HEMCO take the frustration out of your Gage Calibration and replacement program!

Hemco's Calibration Service takes place in one of two environmentally controlled inspection labs with excellent turn around times and an ISO 17025 Accredited Certification.

Ring Gages are calibrated using Hemco's 25,000+ in-house master plugs. It is likely we have the set plug to calibrate your thread ring. Our extensive inventory of in-house set plugs allows us to follow ASME, MIL and Federal standards for adjustment/calibration. According to the standard, adjustable GO and NOGO thread ring gages must be reset using the proper set plugs. Calibrating a thread ring to a set plug requires more than measuring the pitch diameter.

*Call to confirm the availability of the master set plug.

We strongly encourage you to send in your existing set plug along with your ring if you have one. Alternatively, you also have the option to purchase a new set plug.

GageSaver™ Service

If possible, the GageSaver™ Service will rework worn gages to like-new through the application of Hemco's unique chrome process or replace with a new HEMCOChrome™ Gage at the reduced price of 10% off.

The GageSaver™ Service applies to the following worn gages regardless of the original manufacturer:

- Thread Plugs, Set Plugs and Thread Rings.
- Cylindrical Plugs and Rings.
- Standard or Special.
- Inch or Metric.

GageSaver Service™ not only saves you money on your gage replacement needs, it provides you with a gage which is:

- HEMCOChrome™ Plated.
- Guaranteed not to chip or peel.
- Built to the high side of the tolerance.
- Lasts 3-5x times longer than competitor gages.

The only exclusions from the HEMCO GageSaver™ Service are the rare proprietary and patented gages which HEMCO may be legally restrained from manufacturing.

*Although Hemco has over 25,000 master plugs, you may need to supply or purchase a master to calibrate your master thread rings.

* When you upgrade your worn gage with a new HEMCOChrome™ gage using our GageSaver™ Service, please note that the original gage will become the property of Hemco and is not eligible for return.

Your Worn Gages Are Worth Money!

Expedited Lead Times with our ASAP Service

Get your gaging fast!

Whether you're dealing with damage, loss, planning oversights, or navigating customer audits, our ASAP program is tailored to address your urgent gage requirements. Simply give us a call to explore the benefits of our ASAP Program.

As part of our commitment to prompt service, our ASAP program covers Next Day Air freight charges for gages under 4 inches, shipping to destinations within the lower 48 states. Please note that a minimum order of \$200 is required to take advantage of this service. With our ASAP program, we prioritize your satisfaction, ensuring a swift and dependable solution to keep your operations seamlessly on track.

Lead times are subject to change and will be stated at time of quote. We reserve the right to decline quoting on certain types of gages.

Special Purpose Gaging and Thread Gages above 4" are available through the ASAP program by special quote. Next Day Air Freight not included.

Shipment Guaranteed!

Over 99.6% "on time" since HEMCO's ASAP Service was started in 1991. If the gage is not delivered as promised, the ASAP price will be rolled back and invoiced at the regular Hemco list price (upon request).

Scan the QR Code for Terms and Conditions



Quality Gages

Hemco's products are recognized throughout the world for their longer life and outstanding quality. HEMCOChrome™ Gages are guaranteed not to chip or peel for the entire life of the gage (excluding normal wear and tear).

What sets us apart from the competition?

Hemco has been manufacturing gages for over 65 years. Our experience and knowledge allows us to manufacture the difficult gages that competitors find challenging. Combine that with our HEMCOChrome™ and you have a quality, longer lasting gage.

Certificate of Compliance

All new Hemco standard gages are supplied with a Certification of Compliance at no charge if other certifications are not purchased.



ISO Certification

Hemco was the first gage manufacturer to become ISO certified. Hemco has since held this certification since the late 1980s. ISO/IEC 17025 was developed to assess the competency of testing and calibration laboratories. Accreditation to ISO/IEC 17025 attests that: we have demonstrated competence to perform the specific calibrations or types of calibrations listed in our Scope of Accreditation; our quality system addresses and conforms to all the elements of ISO/IEC 17025, including calibration procedures; calibrations are performed by properly trained personnel using controlled methods and procedures; we are operating in accordance with our quality system; and we conform to any additional requirements of A2LA or specific fields or programs necessary to meet particular user needs. Laboratories that comply with ISO/IEC 17025 also operate in accordance with ISO 9001. Conformance to ISO 9001 alone does not demonstrate a lab's ability to produce technically valid data results, and all ISO 9001 elements relevant to calibration services within a laboratory's quality system are incorporated into ISO 17025.

API Certifications

Hemco is one of only two manufacturers in the United States licensed to manufacture API Masters. The American Petroleum Institute (API) established a tightly controlled gaging program to insure that the API thread form specifications are met in the manufacturing of oil field equipment, tools and pipe. API requires that those manufacturers using the API monogram inspect these components with working gages set to API master gages. HEMCO is licensed by the Institute to use the API monogram on all the API Spec 5B, Spec 7-2 and Spec 11B Master gages we manufacture.



5B-0009
7-2-0081
11B-0013

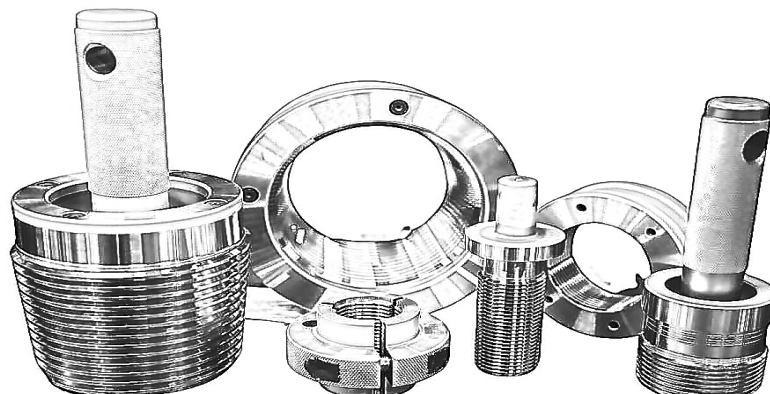


Working & Master Gages

The American Petroleum Institute (API) established a tightly controlled gaging program to insure that the API thread form specifications are met in the manufacturing of oil field equipment, tools and pipe. API requires that those manufacturers using the API monogram inspect these components with working gages set to API master gages. HEMCO is licensed by the Institute to use the API monogram on all the API Spec 5B, Spec 7-2 and Spec 11B Master gages we manufacture.

API Specification & Other Connections				
Specification	Type	Size Range	Threads Per Inch	Taper Per Foot
Spec 5B	External Upset (UP TPG)	1.050 thru 1.900	10	3/4
	External Upset (UP TPG)	2-3/8 thru 4-1/2	8	
	Non-Upset Tubing (TBG)	1.050 thru 3-1/2	10	
	Non-Upset Tubing (TBG)	4, 4-1/2	8	
	Round Casing (CSG)	4-1/2 thru 13-3/8	8	
	Standard Line Pipe (LP)	1/8 thru 12	27 thru 8 TPI	
Spec 7-2	Numbered Connections	NC23 thru NC50	4	2
	Numbered Connections	NC56 thru NC70	4	3
	Regular Rotary (left hand also)	6-5/8	4	2
	Regular Rotary (left hand also)	5-1/2, 7-5/8, 8-5/8	4	3
	Regular Rotary (left hand also)	2-3/8 thru 4-1/2	5	3
	Regular Rotary (left hand also)	1, 1-1/2"	6	1-1/2
	Full Hole	5-1/2, 6-5/8	4	2
Spec 11B	Sucker Rods	5/8 thru 1-1/8	10	Not tapered
Spec 11AX	B Connection	178	11.5	3/8
	B Connection	225, 275	11.5	3/4
	L Connection	3/8, 1/2, 3/4	18, 14, 14	3/4
Spec 6A	Non-Upset Shar Vee (CR Thds)	1-1/2 thru 3	11.5	3/4
Other Connections	Extra Hole	2-7/8, 3-1/2	4	2
	Full Hole	2-7/8, 3-1/2, 4-1/2	5	3
	Full Hole (left hand)	5-1/2, 6-5/8	4	2
	Internal Flush (left hand also)	5-1/2, 6-5/8	4	2
	PAC Tools	2-3/8, 2-7/8	4	1-1/2
	Regular H90	3-1/2 thru 8-5/8	3.5	2
	Simline H90	2-3/8, 2-7/8, 3-1/2	3	1-1/4

- HEMCOChrome™
- Increases wear life 3-5x.
- Stops corrosion caused by salt spray and high humidity.



Design & Build

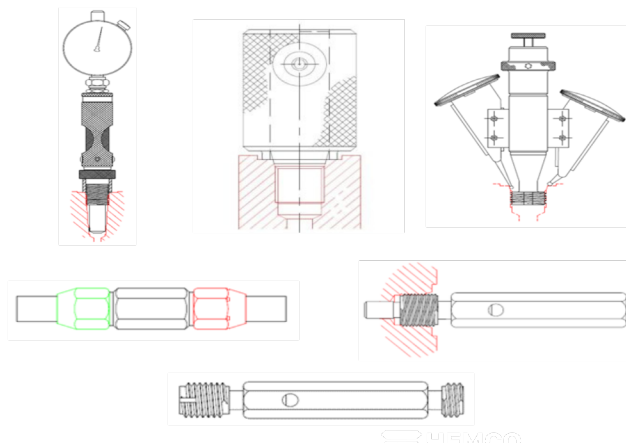
Do you have a difficult feature that needs to be measured with precision? Our design and build department has your solution!

Our expert team specializes in crafting customized solutions. We can help you measure even the trickiest features with ease. Trust us to create a solution that's tailored to your specific needs. Capacity to design and manufacture various style gages from customer product prints.

- Special Go/Nogo gages
- Trepan Gages
- Concentricity gages
- Flush Pin gages
- SAE Port Gaging
- Snap gages
- Feeler gages
- Slot gages
- Special Masters
- Special Plug gages
- Special Ring gages
- True Position Gages
- Tapered Plug & Ring gages
- Keyway gages
- Form gages
- Hex Plugs
- Counterbore Depths
- Alignment Plugs
- Runout Gages
- Bench top fixtures
- Go/Nogo attribute templates
- Profile templates

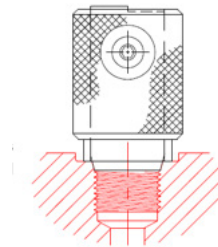
Hydraulic Port Gaging:

Hemco manufactures various style gages to check features on both threaded O-ring style hydraulic ports and threaded inverted flare style hydraulic ports.



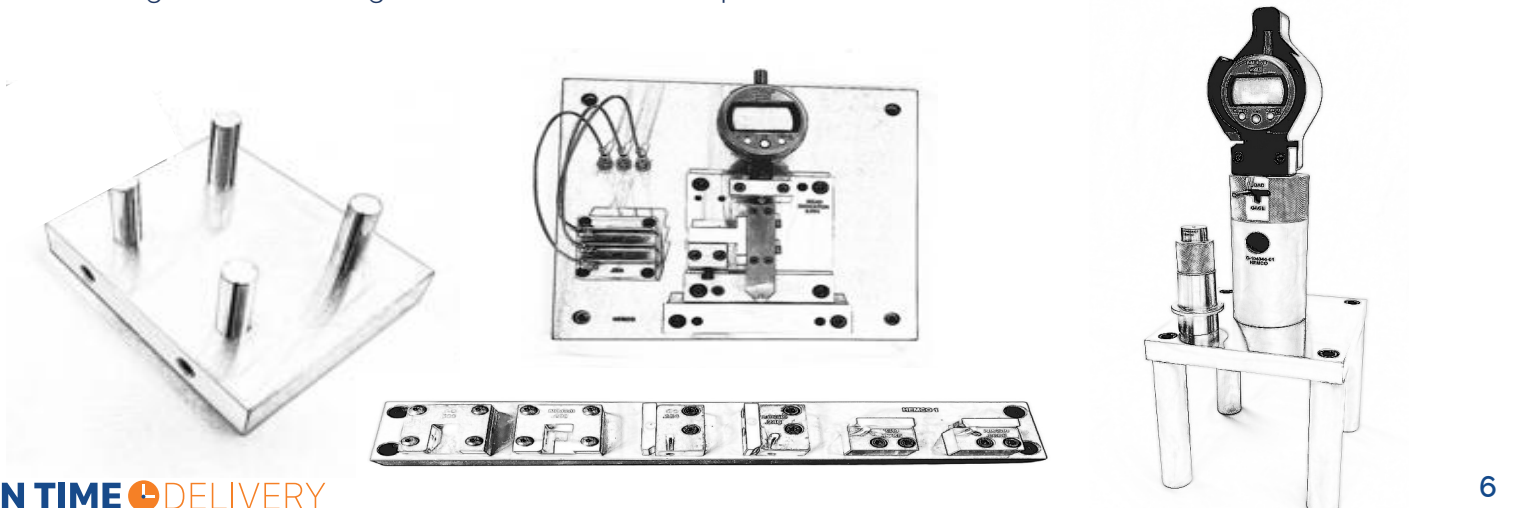
Flush Pins:

Go/Nogo style attribute gages. Used to check: hole depths, hole chamfer depths, counterbore depths and various features.



Benchtop Fixtures:

Need to check various features on a product? Either attribute or variable? We can design a fixture to do a quick, functional check. Designed to check length, widths and/or hole true position.

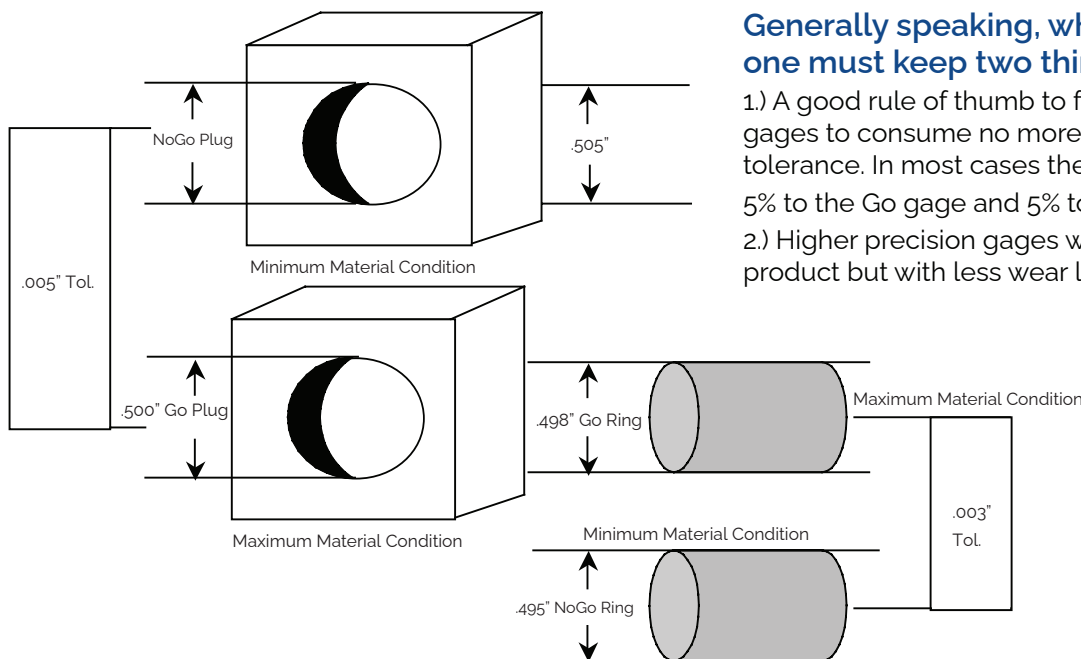


The purpose of limit gaging is to establish whether a particular feature size is functionally in tolerance.

Go gages, if they pass through the feature, we know with certainty that we have not exceeded a maximum material condition. For example: imagine a perfect 1 inch cube of steel through which we must drill one hole of $.500 +.005 /-.000$. If the Go plug gage fits, the hole could not be smaller than $.500$. If it does not fit, it indicates the hole is too small leaving our cube with too much material. The mating part could be a 2" long shaft with an outside diameter of $.498 +.000 /-.003$. This time, a Go cylindrical ring gage would be used. If you could pass the shaft through this gage, you are assured the shaft isn't larger than $.498$ and the maximum material condition has not been exceeded. These two parts would assemble with a minimum clearance between them of $.002$, assuming they are each at maximum material condition.

NoGo gages provide assurance that we have not dropped below the minimum material condition specified for our part. In the case of our cube, if our NoGo plug gage does not fit, this indicates our hole is not larger than $.505$. If it did fit, we know our hole is too large and our cube now has too little material left. Referring to the mating shaft, our NoGo ring gage will not fit as long as the shaft is at least $.495$. If it does fit, we know our shaft is undersize. Hence, with one set of Go and NoGo plug gages to check the hole in the cube and one set of Go and NoGo ring gages to check the shaft, you can easily determine the limits of your product tolerances and their maximum and minimum material conditions. Go and NoGo thread gages provide the same determination of product limits and tolerances for threaded parts.

No other gaging system offers the functional assurance of assembleability between mating parts and product tolerances at such an economical cost. It is because of this that HEMCO will continue to offer the best value for your limit gaging dollar.



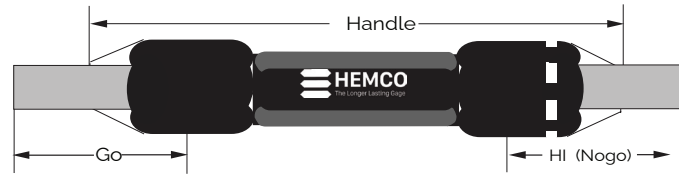
Generally speaking, when ordering gages, one must keep two things in mind:

- 1.) A good rule of thumb to follow is to allow the gages to consume no more than 10% of your product tolerance. In most cases the 10% is divided equally, 5% to the Go gage and 5% to the NoGo gage.
- 2.) Higher precision gages will accept slightly more product but with less wear life and greater expense.

Double End Go & NoGo



Wire Type Double End Go & NoGo



- HemcoChrome™ Process.
- All gages are made to ASME B47.1 and B89.1.5.
- Gages normally furnished to the Unilateral tolerance system: Go + Plus tolerance. NoGo - Minus tolerance.

Plain Cylindrical Reversible Plug Gages									
Decimal Range		Metric Range		General Dimensions					
Above	To and Including	Above	To and Including	Style	Go Member Length	NoGo Member Length	Handle No.	Handle Length	Width across flat of handle
0.010	0.075	0.25	1.91	Wire Type	2	2	1W	2-1/4	1/4
0.075	0.180	1.91	4.57	Wire Type	2	2	2W	2-11/16	3/8
0.180	0.281	4.57	7.14	Wire Type	2	2	3W	3-5/16	9/16
0.281	0.406	7.14	10.31	Wire Type	2	2	4W	3-9/16	11/16
0.406	0.510	10.31	12.95	Wire Type	2	2	5W	4-1/4	13/16
0.510	0.635	12.95	16.13	Wire Type	2	2	6W	4-1/2	15/16
0.635	0.760	16.13	19.30	Wire Type	2	2	7W	4-5/8	11/16
0.760	1.010	19.30	25.65	Wire Type	2	2	8W	2-1/2	1-1/4
0.760	0.947	19.30	24.05	Trilock	1-1/4	3/4	2-1/2	4	1/2
0.947	1.135	24.05	28.83	Trilock	1-3/8	3/4	3-1/2	4	5/8
1.135	1.510	28.83	38.35	Trilock	1-1/2	3/4	4-1/2	4	13/16
1.510	2.010	38.35	51.05	Trilock	1-7/8	7/8	5-1/2	4-1/2	1
2.010	2.510	51.05	63.75	Trilock	2	7/8	6	5	1-1/8
2.510	3.510	63.75	89.15	Trilock	2	1	7	6	1-1/4
3.510	8.010	89.15	203.45	Trilock	2-1/8	1	7	6	1-1/4
8.010	12.010	203.45	305.05	Annular	2-1/4	1	Ball Handles		

- The feature of reversible gages is that when one end becomes worn or damaged, the gage member can be reversed providing a new gage.
- Exceptional value, essentially two gage members for the price of one.
- Wire type members are held securely by bushings compressed when the aluminum nuts are tightened.
- Trilock members are secured by cap screws into handle.

How to order Reversible Plain Cylindrical Plug Gages

Plain Cylindrical Reversible Plugs	Qty	Exact Diameter(s)	Select One					Special Options
			Style	Condition	Condition	Tolerance	Certifications	
			Wire Reversible Trilock	Single End, Double End, Long Go, Progressive	Go NoGo	"XX" "X" "Y" "Z" "ZZ"	Long Form ISO 17025	Special Length, Marking Instr, Special Colored Handles, Depth Notches
Example	1	2.875	Trilock	Single End	Go	XX	Long Form Note 4	Radius Note 2

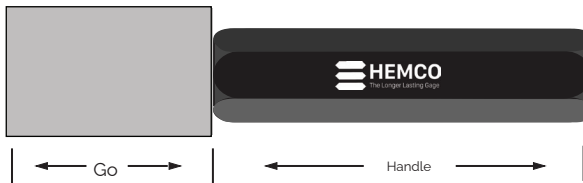
Notes:

1. Unless specified, standard gage handles are black anodized. Metric gage handles are yellow anodized.
2. Drawings must accompany orders for specials where applicable.
3. Gage makers tolerance: XX, X, Y, Z, ZZ.
4. See page 4 for explanation of HEMCO Standard Long form & ISO 17025 Certifications

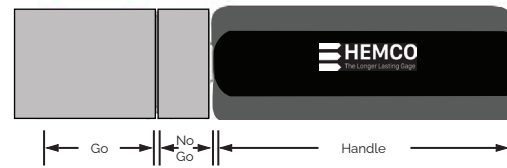


- HemcoChrome™ Process.
- All gages are made to ASME B47.1 and B89.1.5.
- Gages normally furnished to the Unilateral tolerance system: Go + Plus tolerance. NoGo - Minus tolerance.
- Gage members under .150 have male centers.
- Gage members over .150 have female centers.

Long Go



Progressive



Plain Cylindrical Taperlock Plug Gages									
Decimal Range		Metric Range		General Dimensions					
Above	To and Including	Above	To and Including	Go Member Length	NoGo Member Length	Long Go Member Length	Handle No.	Handle Length	Width Across Flat of Handle
0.059	0.105	1.50	2.67	3/8	3/16	11/16	0	1-1/2	3/16
0.105	0.150	2.67	3.81	3/8	7/32	23/32	0	1-3/4	1/4
0.150	0.230	3.81	5.84	13/32	9/32	13/16	0	2	5/16
0.230	0.365	5.84	9.27	3/4	5/16	1-3/16	1	2-3/4	3/8
0.365	0.510	9.27	12.95	1	3/8	1-1/2	2	3	1/2
0.510	0.825	12.95	20.96	1-1/4	1/2	1-7/8	3	3-1/4	11/16
0.825	1.135	20.96	28.83	1-1/2	5/8	2-1/8	4	3-5/8	7/8
1.135	1.510	28.83	38.35	1-5/8	3/4	2-3/8	5	4	1

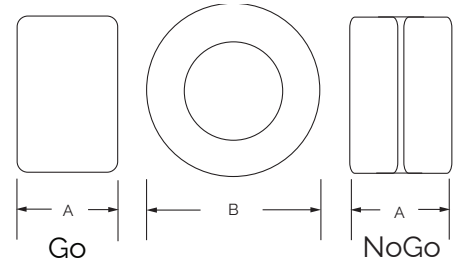
How to order Taperlock Plain Cylindrical Plug Gages							
Plain Cylindrical Taperlock Plugs	Qty	Exact Diameter(s)	Select One				Special Options
			Condition	Condition	Tolerance	Certifications	
			Single End. Double End. Long Go. Progressive	Go or Nogo	"XX" "X" "Y" "Z" "ZZ"	Long Form ISO 17025	
Example	1	2.875	Go		XX	Long Form	Radius
					Note 3	Note 4	Note 2

Notes:

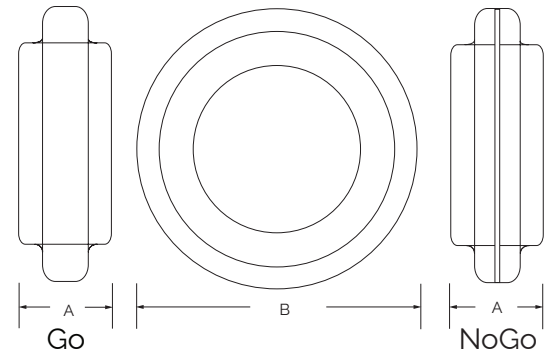
1. Unless specified, standard gage handles are black anodized. Metric gage handles are yellow anodized.
2. Drawings must accompany orders for specials where applicable.
3. Gage makers tolerance: XX, X, Y, Z, ZZ.
4. See page 4 for explanation of HEMCO Standard Long form & ISO 17025 Certifications

- HEMCOChrome™ Process
- All gages are made to ASME Std B47.1 and in accordance with ASME B8g .1.6.
- Master-Bilateral: 1/2 tolerance. Go: - (minus) tolerance, NoGo: + (plus) tolerance.
- Guaranteed against chipping or peeling (excluding normal wear and tear).
- NoGo rings are identified by a groove around the outside diameter.

Plain Cylindrical Ring Gages						
Decimal Range		Metric Range		General Dimensions		
Above	To and Including	Above	To and Including	Ring Size Number	Ring Outside Diameter "B" Dim.	Ring Thickness "A" Dim.
0.059	0.150	1.50	3.810	0	15/16	3/16
0.150	0.230	3.81	5.842	0	15/16	3/8
0.230	0.365	5.842	9.270	1	1-1/8	9/16
0.365	0.510	9.27	12.95	2	1-3/8	3/4
0.510	0.825	12.95	20.96	3	1-3/4	15/16
0.825	1.135	20.96	28.83	4	2-1/8	1-1/8
1.135	1.510	28.83	38.35	5	2-1/2	1-5/16
1.510	2.010	38.35	51.05	6	4	1-1/2
2.010	2.510	51.05	63.75	7	4-1/2	1-1/2
2.510	3.010	63.75	76.45	8	5	1-1/2
3.010	3.510	76.45	89.15	9	5-1/2	1-1/2
3.510	4.010	89.15	101.85	10	6-1/4	1-1/2
4.010	4.760	101.85	120.90	11	7-1/4	1-1/2
4.760	5.510	120.90	139.95	12	8-1/4	1-1/2
5.510	6.260	139.95	159.00	13	9-1/4	1-1/2
6.260	7.010	159.00	178.05	14	10-1/4	1-1/2
7.010	7.760	178.05	197.10	15	11-1/4	1-1/2
7.760	8.510	197.10	216.15	16	12-1/4	1-1/2
8.510	9.260	216.15	235.20	17	13-1/4	1-1/2
9.260	10.010	235.20	254.25	18	14-1/4	1-1/2
10.010	10.760	254.25	273.30	19	15-1/4	1-1/2
10.760	11.510	273.30	292.35	20	16-1/4	1-1/2
11.510	12.260	292.35	311.40	21	17-1/4	1-1/2



Style up to 1.510"



Style from 1.510" & up.

How to order Cylindrical Ring Gages						
Plain Cylindrical Rings	Qty	Exact Diameter	Select One			Special Options
			Condition	Tolerance	Certifications	
			Go/Max/Minus Tol NoGo/Min/Plus Tol Master/Bilateral Tol	"XX" "X" "Y" "Z" "ZZ"	Long Form, 17025 ISO	Tapped holes for handles, Slots, Air Grooves, Special Length, Marking Instructions, Radius.
Example	1	2.875"	Go	XX	Long Form	Radius
				Note 1	Note 2	Note 3

Notes:

1. Gage makers tolerance: XX, X, Y, Z, ZZ.
2. See Page 4 for explanation of HEMCO Standard and ISO 17025 Certifications.
3. When the Gage is special, please include all necessary information such as: tapped holes for handles, special thickness, slots, air grooves, marking instructions.



HEMCOChrome™ Pins

Standard Inch

- HemcoChrome™ Process.
- Sizes .039" through 1.0005" in .0001" increments (available from stock).
- May be purchased individually.
- Also available in Class "X" or "XX" Go (+) or Nogo (-) in sizes .039" through 1.00009" in .0001 Increments.

Metric

- HemcoChrome™ Process.
- .Sizes .991 mm through 25.55 mm (available from stock).. 01 mm increments.
- May be purchased individually.
- Also available in Class "X" or Class "XX" Go (+) or Nogo (-).

Master Setting Discs

- HemcoChrome™ Process.
- All gages conform to ASME B47.1.
- Styles 1 and 3 are normally furnished with a bilateral tolerance: 1/2 tolerance.
- Style 2 normally furnished to the unilateral tolerance system: Go:- (minus) tolerance, NoGo: + (plus) tolerance.
- Style 2, 1.510 dia. to and including 8.010 dia. are two Style 3 master discs separated by an AGD separator plate and held together with a tie rod and insulators.

Master Discs						
Inch Range Diameters		Metric Range Diameters		General Dimensions		
Above	To & Including	Above	To & Including	Style 1 Length	Style 2 Length: 2 Diameters - Length of each dia.	Style 3 Length
0.105	0.150	2.67	3.81	3/4	5/16	3/8
0.150	0.230	3.81	5.80	7/8	3/8	7/16
0.230	0.365	5.80	9.27	1	7/16	1/2
0.365	0.510	9.27	12.95	1-1/8	1/2	9/16
0.510	0.825	12.95	20.95	1-1/4	9/16	5/8
0.825	1.135	20.95	28.83	1-3/8	5/8	11/16
1.135	1.510	28.83	38.35	1-5/8	3/4	13/16
1.510	2.010	38.35	51.05	1-7/8	7/8	7/8
2.010	2.510	51.05	63.75	2	1	7/8
2.510	3.510	63.75	89.15	2	1	1
3.510	8.010	89.15	203.45	2-1/8	1	1

When ordering please specify:

1. Quantity Required.
2. Exact Diameter of Member.
3. Gage makers tolerance: XX, X, Y or Z.
4. Style: 1, 2, or 3.
5. HEMCO Standard Long Form or ISO 17025 Certification if required.
6. When gage is special, please include all necessary information such as: Marking Instructions, Certifications, etc.

Thread Gage Tolerance																				
X Tolerance									W Tolerance											
Pitch Diameter					Major & Minor		Half Angle	Lead	Pitch Diameter						Major & Minor			Half Angle	Lead	
Threads per Inch	To & Inc. 1-1/2"	Above 1-1/2" to 4"	Above 4" to 8"	Above 8" to 12"	To 4" Inc.	Above 4"	Tol +/-	Tol +/-	Threads per Inch	To & Incl. 1/2"	Above 1/2" to 1-1/2"	Above 1-1/2" to 4"	Above 4" to 8"	Above 8" to 12"	To & Incl 1/2"	Above 1/2" to 4"	Above 4"	Tol +/-	To & Incl. 1/2" tol +/-	Above 1/2" tol +/-
80	.0002				.0003		30	.0002	80	.0001	.00015				.0003	.0003		20	.0001	.00015
72	.0002				.0003		30	.0002	72	.0001	.00015				.0003	.0003		20	.0001	.00015
64	.0002				.0004		30	.0002	64	.0001	.00015				.0003	.0004		20	.0001	.00015
56	.0002	.0003			.0004		30	.0002	56	.0001	.00015	.0002			.0003	.0004		20	.0001	.00015
48	.0002	.0003			.0004		30	.0002	48	.0001	.00015	.0002			.0003	.0004		18	.0001	.00015
44	.0002	.0003			.0004		20	.0002	44	.0001	.00015	.0002			.0003	.0004		15	.0001	.00015
40	.0002	.0003			.0004		20	.0002	40	.0001	.00015	.0002			.0003	.0004		15	.0001	.00015
36	.0002	.0003			.0004		20	.0002	36	.0001	.00015	.0002			.0003	.0004		12	.0001	.00015
32	.0003	.0004	.0005	.0006	.0005	.0007	15	.0003	32	.0001	.00015	.0002	.00025	.0003	.0003	.0005	.0007	12	.0001	.00015
28	.0003	.0004	.0005	.0006	.0005	.0007	15	.0003	28	.0001	.00015	.0002	.00025	.0003	.0005	.0005	.0007	8	.00015	.00015
27	.0003	.0004	.0005	.0006	.0005	.0007	15	.0003	27	.0001	.00015	.0002	.00025	.0003	.0005	.0005	.0007	8	.00015	.00015
24	.0003	.0004	.0005	.0006	.0005	.0007	15	.0003	24	.0001	.00015	.0002	.00025	.0003	.0005	.0005	.0007	8	.00015	.00015
20	.0003	.0004	.0005	.0006	.0005	.0007	15	.0003	20	.0001	.00015	.0002	.00025	.0003	.0005	.0005	.0007	8	.00015	.00015
18	.0003	.0004	.0005	.0006	.0005	.0007	10	.0003	18	.0001	.00015	.0002	.00025	.0003	.0005	.0005	.0007	8	.00015	.00015
16	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	16	.0001	.0002	.00025	.0003	.0004	.0006	.0006	.0009	8	.00015	.00015
14	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	14	.00015	.0002	.00025	.0003	.0004	.0006	.0006	.0009	6	.0002	.0002
13	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	13	.00015	.0002	.00025	.0003	.0004	.0006	.0006	.0009	6	.0002	.0002
12	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	12	.00015	.0002	.00025	.0003	.0004	.0006	.0006	.0009	6	.0002	.0002
11.5	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	11.5	.00015	.0002	.00025	.0003	.0004	.0006	.0006	.0009	6	.0002	.0002
11	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	11	.00015	.0002	.00025	.0003	.0004	.0006	.0006	.0009	6	.0002	.0002
10	.0003	.0004	.0006	.0008	.0006	.0009	10	.0003	10		.0002	.00025	.0003	.0004		.0006	.0009	6		.00025
9	.0003	.0004	.0006	.0008	.0007	.0011	10	.0003	9		.0002	.00025	.0003	.0004		.0007	.0011	6		.00025
8	.0004	.0005	.0006	.0008	.0007	.0011	5	.0004	8		.0002	.00025	.0003	.0004		.0007	.0011	5		.00025
7	.0004	.0005	.0006	.0008	.0007	.0011	5	.0004	7		.0002	.00025	.0003	.0004		.0007	.0011	5		.0003
6	.0004	.0005	.0006	.0008	.0008	.0013	5	.0004	6		.0002	.00025	.0003	.0004		.0008	.0013	5		.0003
5		.0005	.0006	.0008	.0008	.0013	5	.0004	5			.00025	.0003	.0004		.0008	.0013	4		.0003
4.5		.0005	.0006	.0008	.0008	.0013	5	.0004	4.5			.00025	.0003	.0004		.0008	.0013	4		.0003
4		.0005	.0006	.0008	.0009	.0015	5	.0004	4			.00025	.0003	.0004		.0009	.0015	4		.0003

Cylindrical Gage Tolerances								
Size Range Inches		Size Range Metric		Gage Maker's Tolerances				
Above	To and Including	Above	To and Including	XX Tolerance	X Tolerance	Y Tolerance	Z Tolerance	ZZ Tolerance
.016	.825	.40	20.95	.00002	.00004	.00004	.00010	.00020
.825	1.51	20.95	38.35	.00003	.00006	.00009	.00012	.00024
1.51	2.51	38.35	63.75	.00004	.00008	.00012	.00016	.00032
2.51	4.51	63.75	114.55	.00005	.00010	.00015	.00020	.00040
4.51	6.51	114.55	165.35	.00007	.00013	.00019	.00025	.00050
6.51	9.01	165.35	228.85	.00008	.00016	.00024	.00032	.00064
9.01	12.01	228.85	305.05	.00010	.00020	.00030	.00040	.00080

Direction of Tolerance	
Cylindrical Rings	Go: Minus Tolerance
	NoGo: Plus Tolerance
	Master: Bilateral 1/2 Plus, 1/2 Minus
Cylindrical Plugs	Go: Plus Tolerance
	NoGo: Minus Tolerance
	Master: Bilateral 1/2 Plus, 1/2 Minus

What class of gage is right for a particular job?

A good rule of thumb is to use A gage that fits within the class that encompasses 10% of the manufacturing tolerance. Typically, 1/2 of the 10% is applied to the Go gage, the other 1/2 is applied to the NoGo gage. Example: a part under .825" has a tolerance of .002". When using Go and NoGo gages each gage should be accurate to at least .0001", or a Class Z Gagemaker's Tolerance.

Major Diameter Thread

The major diameter is the largest diameter of a thread. On the external thread it is the diameter at the threads crest also known as the nominal thread size, and on the internal thread it is the diameter at the threads root.

Pitch Diameter of Thread

The pitch diameter is defined as the diameter of an imaginary cylinder that intersects the midpoint between the major and minor diameters. This intersection point is commonly referred to as the pitch line.

Minor Diameter Of Thread

The minor diameter is the smallest diameter of a thread. On an external thread it is the diameter at the root of the thread, and on an internal thread it is the diameter at the crest of the thread.

Functional Pitch Diameter

The functional pitch diameter includes the cumulative effect of the pitches diameter and deviations in lead, half angle, roundness and taper.

Pitch Of Thread

The threads pitch is the distance from a point on a screw thread to a corresponding point on the next thread. The pitch of an inch thread is expressed as the number of threads per inch. The pitch of a metric thread is expressed as an actual.

Examples:

Inch-

1/4"-20 UNC-2A or 20 threads per inch.

To calculate the pitch divide $1" / 20 =$

Pitch is .050

Metric-

M10 X 1-6H or 1mm

Pitch is 1mm to calculate inch equivalent

divide $1\text{mm} / 25.4 = .03937"$

Included Angle Of Thread

Included angle between the right and left flanks of the thread.

Half Angle Of Thread

The half angle of the thread as measured perpendicular to the threads axis and the threads flank angle.

Thread Root

The thread root is located at the bottom of the thread. The threads root is generally manufactured with a sharp vee to a maximum of $1/8P$. With the exception of "J" threads which have a controlled thread radius for added strength.

Thread Crest

The threads crest is located at the top of the thread, or the major diameter of the external thread and at the minor diameter of the internal thread.

Lead Of Thread

Lead of the thread is the distance a part is advanced in one single revolution. In a single start thread lead is equal to the pitch.

Lead Angle (Helix Angle)

The lead angle is made by the helix of a thread at its pitch diameter with a line perpendicular to the axis.

Tolerance

The tolerance is the total amount of variation permitted from a specific dimension.

Allowance

Allowance is the intentional difference in correlated dimensions of mating parts.

Length Of Engagement

The length of engagement is the total engagement length of mating parts at assembly.

The Intent & Purpose of Thread Fixed Limit Gaging

The purpose of the Go gage is to assure the product has not exceeded the cumulative maximum material condition on any of its elements. Including the pitch diameter, lead, major diameter, and thread flanks therefore assuring assemble-ability of the products threads to its mating part. The only element of the thread not accounted for in a Go gage is the internal products minor diameter and the external products major diameter. Additional gaging is recommended to account for this.

The sole purpose of the NoGo gage is to assure the product has not exceeded the minimum material condition of the products pitch diameter.

Product Acceptability

The Go thread gage should pass freely across the entire length of the products threads.

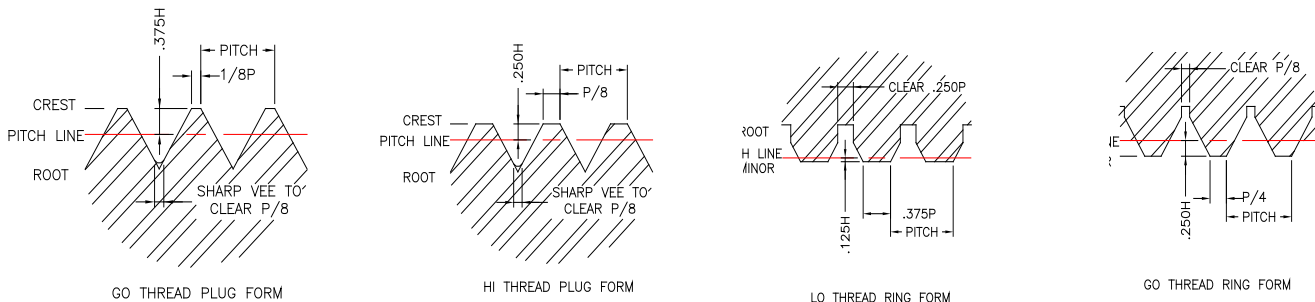
The NoGo (Hi plug) (Lo Ring) thread gage when applied to the product may only engage the products end threads (which may be incomplete threads). The starting threads may be subject the premature wear, this in combination with the products incomplete threads permits further entry. It is therefore considered acceptable for the NoGo gage to go up to 3 threads.

Thread Gage Tolerance

The four critical elements of a thread gage are- Pitch diameter, Major or Minor diameter, Flank angles, and Lead.

Direction of Tolerances

- The direction of tolerances is to assure that the gage is always within the products tolerance range.
- The Go thread ring gage and its setting plug have a minus tolerance.
- The Go thread plug gage has a plus tolerance.
- The NoGo thread ring gage and its setting plug have a plus tolerance.
- The NoGo thread plug has a minus tolerance. It is therefore considered acceptable for the NoGo gage to go up to 3 threads. Special circumstances may necessitate deviation from this practice such as thin walled products or product having a limited number of threads.



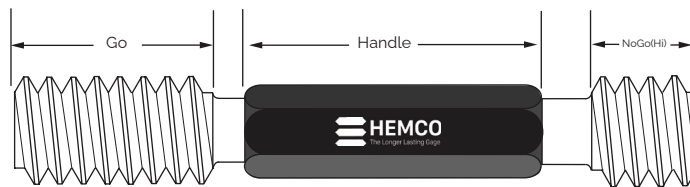
The Design of the Go Thread Gage

- The Go thread gage represents a perfect thread at its maximum material condition.
- The pitch diameter of the thread gage is manufactured to the maximum material condition of the products pitch diameter.
- The major diameter of the thread plug gage is manufactured to the maximum material condition of the products major diameter.
- The minor diameter of the thread ring gage is manufactured to the maximum material condition of the products minor diameter.
- The thread gages flank and lead are manufactured as close to zero as possible.
- The root of the thread plug gage is ground to a sharp vee.
- The root of the thread ring gage is relieved to a width of 1/8P.
- The feather edge of the thread is removed to a blunt start on both ends. (Pitches 28 and finer are chamfered.)

The Design of the Hi or Lo Thread Gage

- The Hi or Lo thread gage represents a perfect thread at its minimum material condition.
- The pitch diameter of the thread gage is manufactured to the maximum material condition of the products pitch diameter.
- The major diameter of a thread plug gage is manufactured to the products maximum pitch diameter plus .5/H.
- The minor diameter of a thread ring gage is manufactured to the products minimum pitch diameter minus H/2.
- The thread gages flank and lead are manufactured as close to zero as possible.
- The root of the thread plug is ground to a sharp vee.
- The root of the thread ring is relieved to a width of .25P.
- The feather edge of the thread is removed to a blunt start on both ends. (Pitches 28 and finer they are chamfered.)

- HEMCOChrome™ Process
- All gages are made to ASME Std. B47.1 and Screw Thread Standards for Federal services: Fed. Std. H28 and ANSI/ASME B1.2 and B1.16M.
- Gage members have tapered shanks which fit corresponding handles.
- Guaranteed against chipping or peeling. (excluding normal wear and tear).
- All standard thread plug gages supplied with Class "X" tolerance on O.D., P.D., lead, flank angles, and straightness.
- Other tolerances can be special quoted.
- Members size larger than .150" have female centers. Members equal to .150" or smaller have male centers.
- Members 32 TPI and coarser are convoluted and have chip grooves. Members finer than 32 TPI are chamfered.



Nominal Size		Decimal		Metric		TPI	General Dimensions					
From	To & Including	From	To & Including	From	To & Including	*** TPI Less Than	Go Member Length	NoGo (HI) Member Length	Handle No.	Handle Length	Width Across Flats	Width Across Hex
#0	#3	.060	.0990	M1.6	M2.5	81	1/4	3/16	000	1-1/2	1/4	-
#4	#6	.1220	.1380	M3	M3.5	61	5/16	7/32	00	1-3/4	1/4	-
#8	#12	.1640	.2160	M4	M5	49	13/32	9/32	0	2	5/16	-
1/4	5/16	.2500	.3125	M6	M8	41	1/2	5/16	1	2-3/4	3/8	.433
3/8	1/2	.3750	.5000	M10	M12	37	3/4	3/8	2	3	1/2	.577
9/16	3/4	.5625	.7500	M14	M20	33	7/8	1/2	3	3-1/4	11/16	.794
7/8	1-1/8	.8750	1.125	M24	M29	29	1	5/8	4	3-5/8	7/8	1.010
1-1/4	1-1/2	1.250	1.500	M30	M38	29	1-1/4*	3/4	5	4	1"	1.155
1-1/4	1-1/2	1.250	1.500	M30	M38	29	1**	3/4	5	4	1"	1.155

*Coarser than 12 TPI **12 TPI and finer ASME Std B47.1 *** See Table 22 ASME B47.1

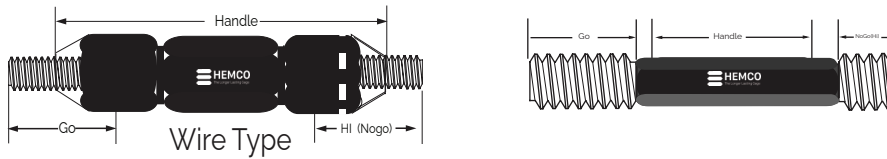
How to Order Taperlock Thread Plug Gages

Taperlock	QTY	Nominal Size & T.P.I	Series	Class	Condition	Handles	Type	Tolerance	Certification	Pitch Diameter	Special Options	
			UNC UNF UNEF UNS Acme Mod. Buttress British Whitworth DIN/JIS	1, 1B, 2, 2B, 3, 3B, 2G, 3G	Go, NoGo, Hi	Member Only (M/O) Single End Double End	Taperlock	"X" "W"	Compliance Long Form ISO 17025		Extended Lead, 90° Threads, Multi-Lead, Left Hand	Special Colored Handle, Special Length, Special Marking
Example 1		3/8-16	UNC	2B	Hi	M/O	TAPL		Long Form	.3401		
See note below:								Note 4	Note 5	Note 2	Note 3	Note 1

Notes:

1. Unless specified, standard gage handles are black anodized. Metric gage handles are yellow anodized.
2. For Standard Pitch Diameter's, consult charts on pages 19-21.
3. Drawings must accompany orders for specials where applicable.
4. Made to "X" tolerance unless specified.
5. See page 4 for explanation of HEMCO Standard and ISO 17025 Certifications.

- HEMCOChrome™ Process
- All gages are made to ASME Std. B47.1 and Screw Thread Standards for Federal services: Fed. Std. H28 and ANSI/ASME B1.2 and B1.16M.
- All standard thread plug gages supplied with Class "X" tolerance on O.D., P.D., lead, flank angles, and straightness. Other tolerances can be special quoted.
- Members size larger than .150" have female centers. Members equal to .150" or smaller have male centers.
- Members 32 TPI and coarser are convoluted and have chip grooves. Members finer than 32 TPI are chamfered.
- The feature of Reversible gages is that when one end becomes worn or damaged, the gage member can be reversed providing a new gage.
- Exceptional value, essentially two gage members for the price of one.



Reversible Thread Plug Basic Dimensions						Style	Go Lengths			NoGo Lengths	Handle No	Handle Length
Nominal Size		Decimal		Metric			7 TPI & Coarser	8 TPI thru 15TPI	13 TPI & Finer	All TPI		
From	To & Including	From	To & Including	From	To & Including					All TPI		
#0	#1	.0600	.0730	M1.6	M1.8	Wire Type	1/2	1/2	1/2	1/2	1W	2-1/4
#2	#5	.0860	.1250	M2	M3	Wire Type	5/8	5/8	5/8	5/8	2W	2-11/16
#6	#8	.1380	.1640	M3.5	M4.5	Wire Type	3/4	3/4	3/4	3/4	2W	2-11/16
#10	1/4	.1900	.2500	M5	M7	Wire Type	7/8	7/8	7/8	7/8	3W	3-5/16
1/4	5/16	.2500	.3125	M8	M8	Wire Type	1	1	1	1	4W	3-9/16
5/16	3/8	.3125	.3750	M9	M10	Wire Type	1-1/8	1-1/8	1-1/8	1-1/8	4W	3-9/16
3/8	7/16	.3750	.4375	M11	M11	Wire Type	1-1/8	1-1/8	1-1/4	1-1/4	5W	4-1/4
7/16	1/2	.4375	.5000	M12	M12	Wire Type	1-3/8	1-3/8	1-3/8	1-3/8	5W	4-1/4
1/2	5/8	.5000	.6250	M13	M16	Wire Type	1-1/2	1-1/2	1-1/2	1-3/8	6W	4-1/2
5/8	3/4	.6250	.7500	M17	M19	Wire Type	1-3/4	1-3/4	1-3/4	1-3/8	7W	4-1/2
3/4	15/16	.7500	.9375	M20	M24	Trilock	1-1/4	1	1	3/4	2-1/2	4
15/16	1-1/8	.9375	1.1250	M25	M28	Trilock	1-3/8	1-1/8	1	3/4	3-1/2	4
1-1/8	1-1/2	1.1250	1.500	M29	M38	Trilock	1-1/2	1-1/4	1	3/4	4-1/2	4
From	To & Including	From	To & Including	From	To & Including	Style	7 TPI & Coarser	8 TPI thru 15TPI	16 TPI & Finer	All TPI	Handle No	Handle Length
1-1/2	2	1.500	2.000	M39	M51	Trilock	1-7/8	1-1/4	7/8	7/8	5-1/2	4-1/2
2	2-1/2	2.000	2.500	M52	M63	Trilock	2	1-3/8	7/8	7/8	6	5
2-1/2	3	2.500	3.000	M64	M76	Trilock	2-1/8	1-1/2	1	1	7	6
3	3-1/2	3.000	3.500	M77	M89	Trilock	2-1/8	1-1/2	1	1	7	6
3-1/2	4	3.500	4.000	M90	M101	Trilock	2-1/8	1-1/2	1	1	7	6
4	4-1/2	4.000	4.500	M102	M114	Trilock	2-1/8	1-1/2	1	1	7	6
4-1/2	5	4.500	5.000	M115	M127	Trilock	2-1/8	1-1/2	1	1	7	6
5	8	5.000	8.000	M128	M203	Trilock	2-1/8	1-1/2	1	1	7	6
8	12	8.000	12.000	M204	M305	Trilock	2-1/4	1-1/2	1	1	Ball Type	

How to Order Reversible Thread Plug Gages

Reversible	QTY	Nominal Size & T.P.I	Series	Class	Condition	Handles	Type	Tolerance	Certification	Pitch Diameter	Special Options	
			UNC UNF UNEF UNS Acme Mod. Buttress British Whitworth DIN/JIS	1, 1B, 2, 2B, 3, 3B, 2G, 3G	Go, NoGo, Hi	Member Only (M/O) Single End, Double End	Reversible	"X" "W"	Compliance Long Form ISO 17025		Extended Lead, 90° Threads, Multi- Lead, Left Hand	Spl Color Hdl Spl Length Spl Mark
Example 1		3/8-16	UNC	2B	Hi	M/O	Reversible		Long Form	.3401		
See note below:								Note 4	Note 5	Note 2	Note 1	

Notes:

1. Unless specified, standard gage handles are black anodized. Metric gage handles are yellow anodized.
2. For Standard Pitch Diameter's, consult charts on pages 19-21.
3. Drawings must accompany orders for specials where applicable.
4. Made to "X" tolerance unless specified.
5. See page 4 for explanation of HEMCO Standard and ISO 17025 Certifications.

STI- SCREW THREAD INSERT PLUG GAGES THREAD MEASURING WIRES

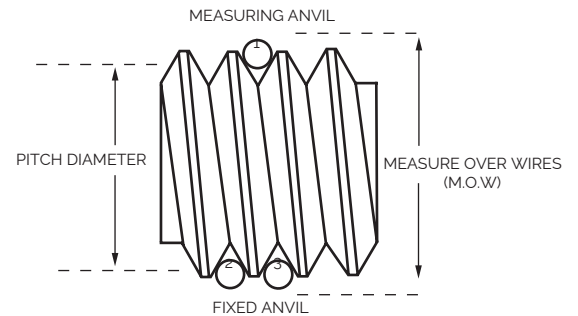
Screw Thread Insert (STI) Plug Gages, Go and NoGo, are specified whenever a wire insert is used to repair a damaged thread or provide for a stronger thread to mating thread application. These gages are designed to check the oversize thread condition needed to allow the wire insert to maintain a standard pitch diameter after insertion. We manufacture all STI gages to X-Tolerance.

STI (Screw Thread Insert) Gages							
Size & TPI	Basic Go PD	Class 2B HI (NoGo) PD	Class 3B HI (NoGo) PD	Size & TPI	Basic Go PD	Class 2B HI (NoGo) PD	Class 3B HI (NoGo) PD
#2-56 UNC	.0976	.0996	.0989	5/16-18 UNC	.3486	.3529	.3515
#3-48 UNC	.1126	.1148	.11405	5/16-24 UNF	.3395	.3433	.3421
#4-40 UNC	.1283	.1308	.1299	3/8-16 UNC	.4156	.4203	.4189
#4-48 UNC	.1256	.1279	.1271	3/8-24 UNF	.4020	.4059	.4047
#5-40 UNC	.1413	.1438	.1430	7/16-14 UNC	.4839	.4890	.4875
#6-32 UNC	.1583	.1611	.1601	7/16-20 UNF	.4700	.4744	.4731
#6-40 UNF	.1543	.1569	.1560	1/2-13 UNC	.5499	.5554	.5537
#8-32 UNC	.1843	.1872	.1862	1/2-20 UNF	.5325	.5731	.5357
#8-36 UNF	.1821	.1849	.1840	9/16-12 UNC	.6167	.6225	.6208
#10-24 UNC	.2170	.2203	.2192	9/16-18 UNF	.5986	.6035	.6020
#10-32 UNF	.2103	.2133	.21235	5/8-11 UNC	.6841	.6903	.6885
#12-24 UNC	.2430	.2464	.24535	5/8-18 UNF	.6611	.6661	.6646
1/4-20 UNC	.2825	.2864	.2851	3/4-10 UNC	.8149	.8216	.8196
1/4-28 UNF	.2732	.2765	.2754	3/4-16 UNF	.7906	.7961	.7945

Thread Measuring Wires

- Calibrated Thread Wires for 60° Threads.
- Packaged as a 3-wire set with a slip identifying their measuring constant.

The most accurate and universally recognized method of obtaining pitch diameter measurements of thread plug or setting plug gages is by means of using 3 hardened steel measuring wires laid into opposite sides of the thread, as shown in the diagram. Precise measurements with proper pressures over these wires minus the appropriate constant equals the measured pitch diameter.



Unified & American 60° - Standard Sizes							
Threads Per Inch	Nominal Best Wire Size	Threads Per Inch	Nominal Best Wire Size	Threads Per Inch	Nominal Best Wire Size	Threads Per Inch	Nominal Best Wire Size
120	.00481	40	.01443	16	.03608	6	.09623
100	.00577	46	.01604	14	.04124	5-1/2	.10497
96	.00601	32	.01804	13	.04441	5	.11547
90	.00642	30	.01925	12	.04811	4-1/2	.12830
80	.00722	28	.02062	11-1/2	.05020	4	.14434
72	.00802	27	.02138	11	.05249	3-1/2	.16496
64	.00902	26	.02221	10	.05774	3	.17765
56	.01031	24	.02406	9	.06415	3	.19245
50	.01155	22	.02624	8	.07217	2-3/4	.20995
48	.01203	20	.02887	7-1/2	.07698	2-1/2	.23094
44	.01312	18	.03208	7	.08248	2	.28868

Metric 60° - Standard Sizes							
Pitch MM	Nominal Best Wire Size	Pitch MM	Nominal Best Wire Size	Pitch MM	Nominal Best Wire Size	Pitch MM	Nominal Best Wire Size
.2	.1155	.6	.3464	1.5	.8660	4.5	2.5981
.225	.1299	.7	.4041	1.75	1.0104	5.0	2.8868
.25	.1443	.75	.4330	2.0	1.1547	5.5	3.1754
.3	.1732	.8	.4619	2.5	1.4434	6.0	3.4641
.35	.2021	.9	.5196	3.0	1.7321	7.0	4.0415
.4	.2309	1.0	.5774	3.5	2.0207	8.0	4.6188
.45	.2598	1.25	.7217	4.0	2.3094	9.0	5.1962
.5	.2887					10	5.7735

Hemco specializes in manufacturing Special Plugs & Rings of nearly every thread form:

- Acme
- Buttress
- Modified Acmes
- Modified Buttress
- Unusual Angles
- Multiple Starts
- Whitworth
- Solid thread rings
- Hi-Lo Master Setting Plugs
- Tapered Threads
- Special Pipe
- Size Range: #0 to 14"
- Custom Threads
- BPV
- Trapezoidal Threads
- Preplate
- Special PD's
- STI
- Depth Notches
- Special Length



In the manufacturing of special thread gages, we use 0-1 tool steel, a unique heat treating process and HEMCOChrome™. The added value of the unique HEMCOChrome™ process is unsurpassed in special thread gages throughout the industry. [Call your Hemco Distributor or Customer Service for price and delivery.](#)

How to Order Special Thread Plug Gages

Thread Plug Gages	QTY	Nominal Size & T.P.I	Series	Class	Condition	Handles	Type	Tolerance	Certification	Pitch Diameter	Special Options	
			UNC UNF UNEF UNS Acme Mod. Buttress British Whitworth DIN/JIS	1, 1B, 2, 2B, 3, 3B, 2G, 3G	Go, NoGo, HI	Member Only (M/O) Single End, Double End	Taperlock Trilock Reversible	"X" "W"	Compliance Long Form ISO 17025		Extended Lead, 90° Threads, Multi-Lead, Left Hand	Spl Color Spl Length Spl Mark
Example 1		3/8-16	UNC	2A	HI	M/O	TAPL		Long Form.	.3401		
See note below:							Note 1	Note 5	Note 6	Note 2	Note 4	

How to Order Thread Ring Gages & Master Set Plugs

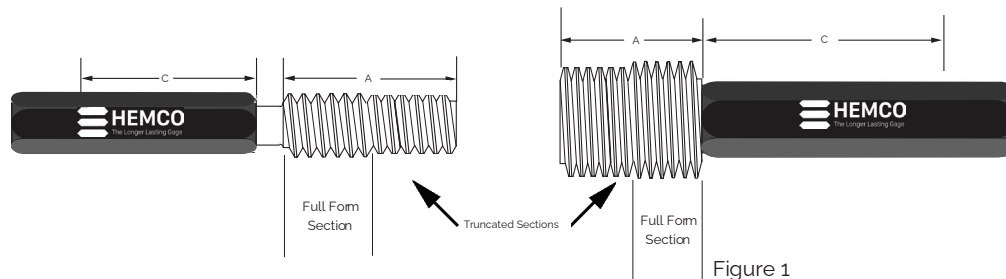
Thread Rings & Master Setting Plugs	QTY	Nominal Size & T.P.I	Series	Class	Condition	Holder	Tolerance	Certification	Pitch Diameter	Ring Options	Set Plug Options
			UNC UNF UNEF UNS Acme Mod. Buttress British Whitworth DIN/JIS	1, 1B, 2, 2B, 3, 3B, 2G, 3G	Go or NoGo (Lo)		"X" "W"	Compliance Long Form ISO 17025		Solid Rings, Left Hand, Pre-Plate, Multi-Lead	Left Hand, Pre-Plate, Multi- Lead, Hi-Lo, Handle
Example 1		3/8-16	UNC	2A	Go	M/O		Long Form	.3331		
See note below:							Note 5	Note 6	Note 2	Note 4	Note 3

Notes:

1. Unless specified, standard gage handles are black anodized. Metric gage handles are yellow anodized.
2. For Standard Pitch Diameter's, consult charts on pages 19-21. Standard classes do not need to be specified.
3. Customer set plugs should be supplied if possible.
4. Drawings must accompany orders for specials where applicable.
5. Made to "X" tolerance unless specified.
6. See page 4 for explanation of HEMCO Standard and ISO 17025 Certifications.

Evaluation of and procedure for setting thread ring gages to master setting plugs.

1. Thoroughly clean, inspect for nicks or damage and calibrate the master setting plug. The master should be straight or have back taper, no front taper, and be in tolerance. Lubricate the master with a thin film of light oil.
2. Thoroughly clean the thread ring gage and inspect for nicks. Remove the sealing wax with a small pointed knife. Turn the locking screw counter clockwise until it is loose. Turn the adjusting screw clockwise, opening the ring until the master freely enters. In some cases a small screwdriver should be levered into the adjustment slot area to facilitate opening the ring as you turn the adjustment screw.
3. Turn the ring gage onto the master plug's full form section with no more than one thread of the ring gage beyond the last thread of the master.



4. Turn the adjustment screw counter clockwise. Rotate ring on master plug until there is a slight drag between them. Tighten the locking screw. The ring should exhibit a larger degree of drag or snug fit to the master. This operation may have to be repeated to obtain the proper degree of drag. The degree of drag is somewhat subjective, particularly with regards to the size and pitch of the gage and where the master is found to be in its tolerance. Generally smaller rings and those set to masters near the low limit would require less drag than larger rings or rings set to masters on the high limit *(See note below).
5. After adjusting and with set plug still inserted, the ring should be tapped with a brass or plastic hammer to fully seat the ring to the master. The drag after doing this should feel the same as before. If not, the ring was not properly seated. Repeat Step 4.
6. Next step, turn the ring gage to the truncated portion at the front half of the master. (Figure 1) The drag should be essentially the same. There should be no shake or play. If there is, the ring has lost its root relief or its flank angles are worn out of tolerance and the ring should be reworked or replaced under Hemco's GageSaver™ Service. (see page 2) Remove the ring from the master.
7. To test the ring gage for taper or bell mouth, turn the ring onto the truncated portion of the master plug 1-1/2 to 2 turns. You should detect some drag. Continue turning the ring onto the master noting any definite difference in the degree of drag. This indicates an unacceptable bell mouth or taper condition. Remove the set plug and follow the above procedure for the other side of the ring. The fit should be about the same on both sides. If the ring is bell mouthed or tapered, it should be reworked or replaced under Hemco's GageSaver™ Service. (see page 2)
8. The minor diameter of the ring can be measured with an internal measuring device or Go and NoGo X-tolerance plain plug gages. The minor diameter of the ring is in tolerance if the Go plug enters and the NoGo does not.
9. It is strongly recommended that once the ring gage has passed all the above, the locking and adjustment screw holes be filled with sealing wax to prevent any tampering.
10. You are now ready to place the ring gage into service.

Note: A thread ring gage setting is unique to the particular setting plug the ring is set to and cannot be expected to be duplicated on any other setting plug without re-adjustment. This is because of differences in allowable gagemaker's tolerances on lead, angles and pitch diameter.

- HemcoChrome™ Process on thread rings, set plugs are 0-1 tool steel unless otherwise specified.
- All gages are made to ASME Std. B47.1 and Screw Thread Standards for Federal services: Fed. Std. H28 and ANSI/ASME B1.2 and B1.16M.
- All thread ring gages are root relieved for adjustability and longer life. NoGo rings are identified by a groove around the outside diameter.
- Setting plugs should be ordered at the same time as ring gages to assure perfect adjustment and provide for inspection of rings once in use.
- Set plugs are built to "X" tolerance on pitch diameter "W" tolerance on lead and flank angles.
- "W" tolerance on pitch diameter is optional and must be specified.

Standard Inch Nominal Range		Metric Nominal Range		Set Plug Dimensions				Ring Dimensions			
				(Refer to Figure 1 on Page 11)							
Above	To and Including	Above	To and Including	Style	For Thin Ring "A" Dim.	For Thick ring "A" Dim.	Handle size	Ring Size	Ring Outside Dia.	Thin Ring Width	Thick Ring Width
.0590	.0900	1.50	2.29	Taperlock	7/32	-	0	1-T	1	1/4	-
.0900	.1050	2.29	2.67	Taperlock	3/8	-	0	1-T	1	1/4	-
.1050	.1500	2.67	3.81	Taperlock	3/8	-	0	1-T	1	1/4	-
.1500	.2300	3.81	5.84	Taperlock	13/32	-	0	1-T	1	1/4	-
.2300	.3650	5.84	9.27	Taperlock	3/4	-	1	2-T	1-3/8	11-32	-
.3650	.5100	9.27	12.95	Taperlock	1	-	2	3-T	1-3/4	7/16	-
.5100	.8250	12.95	20.96	Taperlock	1-1/4	1-7/8	3	4-T	2-3/16	9/16	3/4
.8250	1.1350	20.96	28.83	Taperlock	1-1/2	2-1/8	4	5-T	2-5/8	11/16	15/16
1.1350	1.5100	28.83	38.35	Taperlock	1-5/8	2-3/8	5	6-T	3-1/4	3/4	1-1/8
1.5100	2.0100	38.35	51.05	Trilock	1-7/8	2-7/8	5.5	7-T	3-3/4	13/16	1-1/4
2.010	2.5100	51.05	63.75	Trilock	2	3	6	8-T	4-1/2	7/8	1-5/16
2.5100	3.0100	63.75	76.45	Trilock	2	3-1/8	7	9-T	5	7/8	1-3/8
3.0100	3.5100	76.45	89.15	Trilock	2	3-1/8	7	10-T	5-1/2	15/16	1-7/16
3.5100	4.0100	89.15	101.85	Trilock	2-1/8	3-1/4	7	11-T	6-3/8	15/16	1-1/2
4.0100	4.7600	101.90	120.9	Trilock	2-1/8	3-1/4	7	12-T	7-1/4	1	1-1/2
4.7600	5.5100	120.90	139.95	Trilock	2-1/8	3-1/4	7	13-T	8-1/4	1	1-1/2
5.5100	6.2600	140.00	159.00	Trilock	2-1/8	3-1/4	7	14-T	9-1/4	1	1-1/2
6.2600	7.0100	159.00	178.05	Trilock	2-1/8	3-1/4	7	15-T	10-1/4	1	1-1/2
7.0100	7.7600	178.10	197.10	Trilock	2-1/8	3-1/4	7	16-T	11-1/4	1	1-1/2
7.7600	8.5100	197.10	216.15	Annular	2-1/8	3-1/4	Ball	17-T	12-1/4	1	1-1/2
8.5100	9.2600	216.20	235.20	Annular	2-1/8	3-1/4	Ball	18-T	13-1/4	1	1-1/2
9.2600	10.0100	235.20	254.25	Annular	2-1/8	3-1/4	Ball	19-T	14-1/4	1	1-1/2
10.0100	10.7600	254.30	273.30	Annular	2-1/8	3-1/4	Ball	20-T	15-1/4	1	1-1/2
10.7600	11.5100	273.30	292.35	Annular	2-1/8	3-1/4	Ball	21-T	16-1/4	1	1-1/2
11.5100	12.2600	292.40	311.40	Annular	2-1/8	3-1/4	Ball	22-T	17-1/4	1	1-1/2
Diameter				Thin Blank				Thick Blank			
From #0 to 1/2" Inclusive				All Pitches				Not Applicable			
From 1/2" to 1-1/8" Inclusive				12 TPI and finer except for 9/16-12				12 TPI and coarser			
Above 1-1/8"				10 TPI and finer				10 TPI and coarser			

How to Order Thread Ring Gages & Master Set Plugs

Thread Rings & Master Setting Plugs	QTY	Nominal Size & T.P.I	Series	Class	Condition	Holder	Tolerance	Certification	Pitch Diameter	Ring Options	Set Plug Options
			UNC UNF UNEF UNS Acme Mod. Buttress British Whitworth DIN/JIS	1, 1B, 2, 2B, 3, 3B, 2G, 3G	Go or NoGo (Lo)		"X" "W"	Compliance Long Form ISO 17025		Solid Rings, Left Hand, Pre-Plate, Multi-Lead	Left Hand, Pre-Plate, Multi-Lead, Hi-Lo, Handle
Example 1	1	3/8-16	UNC	2A	Go	M/O	X	Long Form	0.333		
See note below:							Note 4	Note 5	Note 2	Note 3	Note 6

Notes:

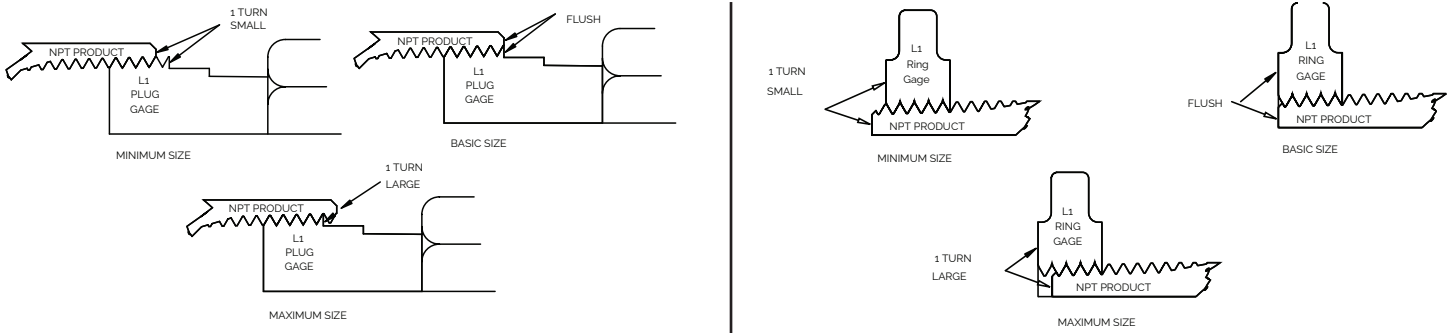
1. Unless specified, standard gage handles are black anodized. Metric gage handles are yellow anodized.
2. For Standard Pitch Diameter's, consult charts on pages 19-21.
3. Drawings must accompany orders for specials where applicable.
4. Made to "X" tolerance unless specified.
5. See Page 4 for explanation of HEMCO Standard and ISO 17025 Certifications.
6. On Special Rings customers are encouraged to furnish their set plugs where possible.

NPT - National Pipe Taper Reference ANSI/ASME B1.20.1

NPT Tapered threads require the inspection of the L1 portion of the product threads with a plug or ring gage. The proper use of these gages include:

- Maintaining calibrated clean and undamaged gages.
- Making sure the product thread is clean and free of burrs.
- The gage is to be applied to the product with HAND TIGHT engagement.
- To establish functional size of the internal thread the L1 plug is to have it's gaging notch flush to plus or minus one turn from the face of the part.
- To establish the functional size of the external thread, the L1 ring is to have it's small end face flush to plus or minus one turn from the face of the part.
- Where a product internal has a chamfer that exceeds the major diameter, the reference plane is the vanishing point of the thread. This along with the proper control of the tool configuration, sound manufacturing practices, and visual inspection will assure the products thread conforms to it's design.

Optional gaging includes: Plug and Ring gages with 3 gaging planes representing the Basic, Min and Max sizes. Also L2, L3 and Plain tapered gages for the major and minor diameters. Calibration consists of the use of a master plug, and ring to assure gage uniformity.



NPT Basic Dimensions					
Nominal & TPI	1 Pitch	Length L1	Major Dia. of plug gage at gaging notch (E1) plane	P.D. of plug & ring gage at gaging notch (E1) plane	Minor Dia. of ring gage at gaging notch (E1) plane
1/16-27	.03704	.1600	.30289	.28118	.25947
1/8-27	.03704	.1615	.39531	.37360	.35189
1/4-18	.05556	.2278	.52763	.49163	.45563
3/8-18	.05556	.2400	.66301	.62701	.59101
1/2-14	.07143	.3200	.82600	.77843	.73086
3/4-14	.07143	.3390	1.03644	.98887	.94129
1-11-1/2	.08696	.4000	1.29654	1.23863	1.18072
1-1/4-11-1/2	.08696	.4200	1.64129	1.58338	1.52547
1-1/2-11-1/2	.08696	.4200	1.88025	1.82234	1.76442
2-11-1/2	.08696	.4360	2.35418	2.29627	2.23836
2-1/2-8	.12500	.6820	2.84541	2.76216	2.67891
3-8	.12500	.7660	3.47175	3.38850	3.30525
3-1/2-8	.12500	.8210	3.97207	3.88881	3.80556
4-8	.12500	.8440	4.47038	4.38712	4.30387
5-8	.12500	.9370	5.53255	5.44929	5.36604
6-8	.12500	.9580	6.58922	6.50597	6.42272

GAGES RECOMMENDED TO CHECK OTHER PIPE THREADS

Type of Thread	Internal Product Threads	External Product Threads
PTF SAE Short	PTF SAE Short L1 & L3 Plug Gages	PTF SAE Short L1 & L2 Ring Gages
ANPT	ANP L1, L3, & Plain 6-Step Plug Gages	ANPT L1, L2, & Plain 6-Step Ring Gages
NPSF	PTF SAE Short L1 Plug	Mates with NPTF External Threads
NPSM	Go & NoGo Plug Gages	Go & NoGo Ring Gages
NPSL	Go & NoGo Plug Gages	Go & NoGo Ring Gages
NH	Go & NoGo Plug Gages	Go & NoGo Ring Gages
NPSH	Go & NoGo Plug Gages	Go & NoGo Ring Gages
NPSC	NPT L1 Plug Gage	Mates with NPT External Threads
BSPT	BSPT Thread Plug/Plain Plug	BSPT Thread Ring/Plain Plug
BSPP	Go & NoGo Plug Gages	GO & Nogo Ring Gages

ISO, JIS (Japanese) & DIN (German) Parallel and Tapered Pipe Thread Gages are also available.

National Pipe Straight Mechanical (NPSM) ANSI/ASME B1.20.1-1983				
Nom. Size & Patch	Thread Plugs		Rings & Set Plugs	
Size	Go P.D.	Hi P.D.	Go P.D.	Lo P.D.
1/8-27	.3736	.3783	.3725	.3689
1/4-28	.4916	.4974	.4903	.4859
3/8-18	.6270	.6329	.6256	.6211
1/2-14	.7784	.7851	.7769	.7718
3/4-14	.9889	.9958	.9873	.9820
1"-11-1/2	1.2386	1.2462	1.2369	1.2311
1-1/4-11-1/2	1.5834	1.5912	1.5816	1.5756
1-1/2-11-1/2	1.8223	1.8302	1.8205	1.8144
2"-11-1/2	2.2963	2.3044	2.2944	2.2882
2-1/2-8	2.7622	2.7720	2.7600	2.7526
3"-8	3.3885	3.3984	3.3862	3.3786
3 1/2-8	3.8888	3.8988	3.8865	3.3788
4"-8	4.3871	4.3971	4.3848	4.3771
5"-8	5.4493	5.5498	5.4469	5.4390
6"-8	6.506	6.5165	6.5036	6.4955

NPSF Pitch Diameters		
Size	Go	NoGo
1/16-27	.2768	.3803
1/8-27	.3692	.3727
1/4-18	.4852	.4904
3/8-18	.6205	.6257
1/2-14	.7700	.7767
3/4-14	.9805	.9872
1"-11-1/2	1.2284	1.2365
1-1/4-11-1/2	1.5760	1.5814

B1.20.5 Specifically states that Go & NoGo Straight Gages are not recommended for size acceptance.

British Standard Pipe Parallel BS EN ISO 228 ("G")												
Size	BSPP Plugs				BSPP Class A Rings & Set Plugs				BSPP Class B Rings & Set Plugs			
	Go PD Inch	Go PD Metric	Hi PD Inch	Hi PD Metric	Go PD Inch	Go PD Metric	NoGo PD Inch	NoGo PD Metric	Go PD Inch	Go PD Metric	NoGo PD Inch	NoGo PD Metric
1/8-28	.36024	9.150	.36472	9.264	.36035	.9153	.35531	9.025	.36035	9.153	.35071	8.908
1/4-19	.48441	12.304	.48961	12.436	.48453	12.307	.47878	12.161	.48453	12.307	.47346	12.026
3/8-19	.62240	15.809	.62760	15.941	.62252	15.812	.61677	15.666	.62252	15.812	.61146	15.531
1/2-14	.77953	19.800	.78531	19.947	.77929	19.794	.77287	19.631	.77929	19.794	.76709	19.484
3/4-14	.99551	25.286	1.00130	25.433	.99528	25.280	.98886	25.117	.99528	25.280	.98307	24.970
1-11	1.25106	31.777	1.25835	31.962	1.25083	31.771	1.24291	31.570	1.25083	31.771	1.23531	31.377
1-1/4-11	1.59205	40.438	1.59933	40.623	1.59181	40.432	1.58390	40.231	1.59181	40.432	1.57630	40.038
1-1/2-11	1.82406	46.331	1.83134	46.516	1.82382	46.325	1.81591	46.124	1.82382	46.325	1.80831	45.931
2-11	2.28906	58.142	2.29634	58.327	2.28882	58.136	2.28091	57.935	2.28882	58.136	2.27331	57.742
2-1/2-11	2.90220	73.716	2.91091	73.937	2.90177	73.705	2.89224	73.463	2.90177	73.705	2.88339	73.238
3-11	3.40220	86.416	3.41091	86.637	3.40177	86.405	3.39224	86.163	3.40177	86.405	3.38339	85.938

Threads are truncated .14784P and Root Cleared. Min/Max P.D. Limits of product are different per BS2779:1986.

BSPT Pitch Diameters (R, Rc/Rp)		
Size	Inch PD	Metric PD
1/16-28	.28118	7.142
1/8-28	.36012	9.147
1/4-19	.48429	12.301
3/8-19	.62228	15.806
1/2-14	.77925	19.793
3/4-14	.99524	25.279
1-11	1.25079	31.770
1-1/4-11	1.59177	40.431
1-1/2-11	1.82378	46.324
2-11	2.28878	58.135
2-1/2-11	2.90177	73.705
3-11	3.40177	86.405
4-11	4.39177	111.551
5-11	5.39177	136.951
6-11	6.39177	162.351

FUNCTION & USE OF DRYSEAL GAGING

The principle of producing a Dryseal thread is based on obtaining crest and root contact at hand-tight engagement, both at the major and minor diameters.

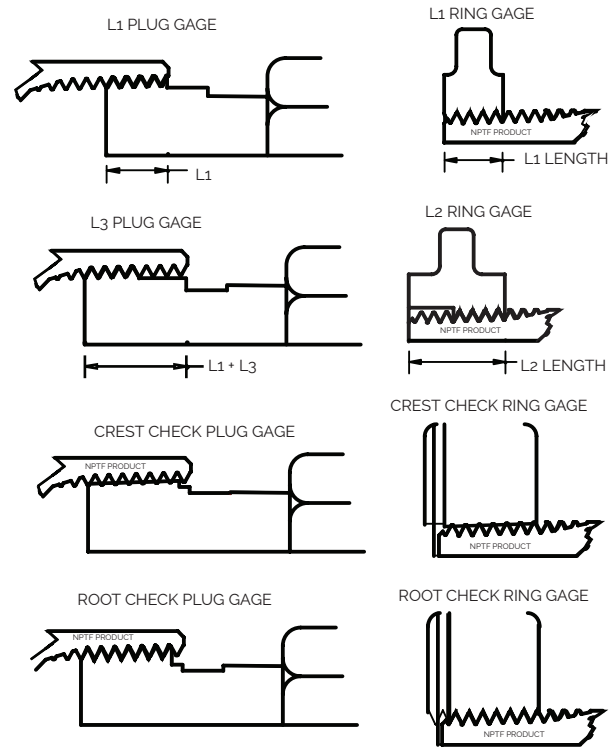
NPTF Thread Gaging ASME B1.20.5-1991

NPTF Class 1 gaging system uses L1 & L3 thread plug gages to gage the internal thread, L1 & L2 ring gages to gage the external threads. The crest and root of the threads are controlled with proper tooling.

NPTF Class 2 gaging system uses L1, L2, & L3 thread gages, with the use of Crest and Root Check gages to gage the major and minor diameter of the product.

Use and Coordination of Gages

1. L1 Plug & Ring gage the functional size of the portion of the products thread that comes in contact with its mating part at hand-tight engagement.
2. L3 Plug & L2 Ring gages the functional size of the portion of the products thread which is provided for wrench tight makeup beyond the L1 thread, and when used in relation to the L1 gage provides indication of taper and length of functional thread.
3. Crest Check Plug & Ring gages the minor diameter of the internal thread and major diameter of the external thread (crest truncation) and is used in relation to the L1 plug or ring.
4. Root Check Plug & Ring gages the major diameter of the internal thread and minor diameter of the external thread (root truncation) and is used in relation to the L1 plug or ring.



Coordination of Gaging

1. The L1 plug or ring gage is used to establish size. The tolerance is plus or minus one turn from the face of the product.

Threads should be classified in the following manner:

Internal threads: Maximum size = out 1 turn.

Basic size = at the notch.

Maximum = in 1 turn.

External threads: Minimum size = in 1 turn.

Basic size = at the face.

Maximum = out 1 turn.

2. The L2 or L3 gage is a relationship gage and when assembled may not vary more than plus or minus 1/2 turn from the position established by the L1 gage.
3. The crest and root check gages are also relationship gages with 6 steps, and when assembled must fall between 2 steps marked minimum (MN MNT), basic (B BT), maximum (MX MXT) as indicated by the position established by the L1 gage.

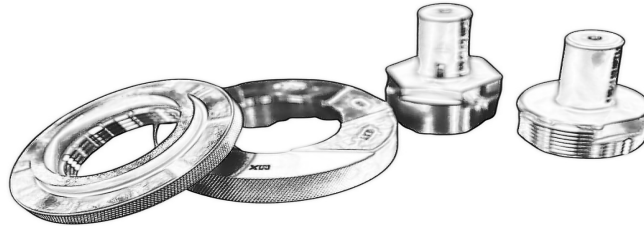
Proper Use and Care:

- 8

These precautions along with proper control of the tool configuration, sound manufacturing practices and visual inspection will provide an acceptable self-sealing thread.

ANPT Aeronautical National Taper Pipe SAE-AS71051

ANPT gaging system uses L1, L2, & L3 thread gages, and 6 Step Crest Check gages to gage the pitch and crest diameter of the product. The process of gaging ANPT threads is basically the same as the NPTF system. The process is reversed for Rings - the L2 is used first and the L1 is a relationship gage. Calibration of NPTF/ANPT gages require the use of a Master Plug and Ring to check for gage wear. However, tapered plugs used to gage NPSF / NPSI which are straight threads receive uneven wear and it is recommend that a single element check be performed for these gages.



Basic Specifications for NPTF L1 & L3 Plugs						
Nominal & T.P.I	Basic Dimensions for NPTF-L1 Plug Gages			Basic Dimensions for NPTF-L3 Plug Gages		
	Length L1	Plug Gage Pitch Dia. at G.P. (E1) Plane	Plug Gage Major Dia. at G.P. (E1) Plane	Length (L1 + L3)	Plug Gage Pitch Dia. at G.P. Basic Step	Plug Gage Major Dia. at S.E. Basic Step
1/16-27	.1600	.28118	.30289	.27110	.2811	.2984
1/8-27	.1615	.37360	.39531	.27260	.3736	.3908
1/4-18	.2278	.49163	.52763	.39450	.4917	.5175
3/8-18	.2400	.62701	.66301	.40670	.6270	.6529
1/2-14	.3200	.77843	.82815	.53430	.7785	.8117
3/4-14	.3390	.98887	1.03859	.55330	.9889	1.0222
1-11-1/2	.4000	1.23863	1.29829	.66090	1.2386	1.2792
1-1/4-11-1/2	.4200	1.58338	1.64304	.68090	1.5834	1.6240
1-1/2-11-1/2	.4200	1.82234	1.88200	.68090	1.8224	1.8629
2-11-1/2	.4360	2.29627	2.35593	.69690	2.2963	2.3368
2-1/2-8	.6820	2.76216	2.85141	1.05700	2.7622	2.8204
3-8	.7660	3.38850	3.47775	1.14100	3.3885	3.4467

Basic Specifications for NPTF L1 & L2 Rings						
Nominal & T.P.I	Basic Dimensions for NPTF-L1 Ring Gages			Basic Dimensions for NPTF-L2 Ring Gages		
	Length L1	Ring Gage Pitch Dia. at G.P. (E1) Plane	Ring Gage Major Dia. at G.P. (E1) Plane	Length L2	Ring Gage Pitch Dia. at L.E. (E2) Plane	Ring Gage Minor Dia. at L.E. (E2) Plane
1/16-27	.1600	.28118	.25947	.26113	.28750	.27024
1/8-27	.1615	.37360	.35189	.26385	.38000	.36274
1/4-18	.2278	.49163	.45563	.40178	.50250	.47661
3/8-18	.2400	.62701	.59101	.40778	.63750	.61161
1/2-14	.3200	.77843	.72871	.53371	.79179	.75850
3/4-14	.3390	.98887	.93915	.54571	1.00179	.96850
1-11-1/2	.4000	1.23863	1.17897	.68278	1.25630	1.21577
1-1/4-11-1/2	.4200	1.58338	1.52372	.70678	1.60130	1.56077
1-1/2-11-1/2	.4200	1.82234	1.76268	.72348	.841301	1.80077
2-11-1/2	.4360	2.29627	2.23661	.75652	2.31630	2.27577
2-1/2-8	.6820	2.76216	2.67291	1.13750	2.79062	2.73237
3-8	.7660	3.38850	3.29925	1.20000	3.41562	3.35737

STANDARD INCH PITCH DIAMETERS:

BASIC, 2B, 3B, 2A & 3A

Standard Inch Pitch Diameters												
No. or Fraction	Decimal Size	T.P.I.		Work Plugs Class			Rings & Setting Plugs Class					
				Go Basic	2B HI	3B HI	3A Go	3A Lo	1A & 2A Go	2A Lo		
#0	0.0600	80	UNF	0.0519	0.0542	0.0536	0.0519	0.0506	0.0514	0.0496		
#1	0.0730	64	UNC	0.0629	0.0655	0.0648	0.0629	0.0614	0.0623	0.0603		
		72	UNF	0.0640	0.0665	0.0659	0.0640	0.0626	0.0634	0.0615		
#2	0.0860	56	UNC	0.0744	0.0772	0.0765	0.0744	0.0728	0.0738	0.0717		
		64	UNF	0.0759	0.0786	0.0779	0.0759	0.0744	0.0753	0.0733		
#3	0.0990	48	UNC	0.0855	0.0885	0.0877	0.0855	0.0838	0.0848	0.0825		
		56	UNF	0.0874	0.0902	0.0895	0.0874	0.0858	0.0867	0.0845		
#4	0.1120	40	UNC	0.0958	0.0991	0.0982	0.0958	0.0939	0.0950	0.0925		
		48	UNF	0.0985	0.1016	0.1008	0.0985	0.0967	0.0978	0.0954		
#5	0.1250	40	UNC	0.1088	0.1121	0.1113	0.1088	0.1069	0.1080	0.1054		
		44	UNF	0.1102	0.1134	0.1126	0.1102	0.1083	0.1095	0.1070		
#6	0.1380	32	UNC	0.1177	0.1214	0.1204	0.1177	0.1156	0.1169	0.1141		
		40	UNF	0.1218	0.1252	0.1243	0.1218	0.1198	0.1210	0.1184		
#8	0.1640	32	UNC	0.1437	0.1475	0.1465	0.1437	0.1415	0.1428	0.1399		
		36	UNF	0.1460	0.1496	0.1487	0.1460	0.1439	0.1452	0.1424		
#10	0.1900	24	UNC	0.1629	0.1672	0.1661	0.1629	0.1604	0.1619	0.1586		
		32	UNF	0.1697	0.1736	0.1726	0.1697	0.1674	0.1688	0.1658		
#12	0.2160	24	UNC	0.1889	0.1933	0.1922	0.1889	0.1863	0.1879	0.1845		
		28	UNF	0.1928	0.1970	0.1959	0.1928	0.1904	0.1918	0.1886		
		32	UNEF	0.1957	0.1998	0.1988	0.1957	0.1933	0.1948	0.1917		
1/4	0.2500	20	UNC	0.2175	0.2224	0.2211	0.2175	0.2147	0.2164	0.2127		
		28	UNF	0.2268	0.2311	0.2300	0.2268	0.2243	0.2258	0.2225		
		32	UNEF	0.2297	0.2339	0.2328	0.2297	0.2273	0.2287	0.2255		
5/16	0.3125	18	UNC	0.2764	0.2817	0.2803	0.2764	0.2734	0.2752	0.2712		
		24	UNF	0.2854	0.2902	0.2890	0.2854	0.2827	0.2843	0.2806		
		32	UNEF	0.2922	0.2964	0.2953	0.2922	0.2898	0.2912	0.2880		
3/8	0.3750	16	UNC	0.3344	0.3401	0.3387	0.3344	0.3311	0.3331	0.3287		
		24	UNF	0.3479	0.3528	0.3516	0.3479	0.3450	0.3468	0.3430		
		32	UNEF	0.3547	0.3591	0.3580	0.3547	0.3522	0.3537	0.3503		
7/16	0.4375	14	UNC	0.3911	0.3972	0.3957	0.3911	0.3876	0.3897	0.3850		
		20	UNF	0.4050	0.4104	0.4091	0.4050	0.4019	0.4037	0.3995		
		24	UNS	0.4104	0.4154	0.4142	0.4104	0.4075	0.4092	0.4053		
		28	UNEF	0.4143	0.4189	0.4178	0.4143	0.4116	0.4132	0.4096		
1/2	0.5000	13	UNC	0.4500	0.4565	0.4548	0.4500	0.4463	0.4485	0.4435		
		20	UNF	0.4675	0.4731	0.4717	0.4675	0.4643	0.4662	0.4619		
		24	UNS	0.4729	0.4780	0.4767	0.4729	0.4700	0.4717	0.4678		
		28	UNEF	0.4768	0.4816	0.4804	0.4768	0.4740	0.4757	0.4720		
		32	UN	0.4797	0.4842	0.4831	0.4797	0.4771	0.4787	0.4752		
9/16	0.5625	12	UNC	0.5084	0.5152	0.5135	0.5084	0.5045	0.5068	0.5016		
		18	UNF	0.5264	0.5323	5308	0.5264	0.5230	0.5250	0.5205		
		24	UNEF	0.5354	0.5405	0.5392	0.5354	0.5325	0.5342	0.5303		
		32	UN	0.5422	0.5467	0.5456	0.5422	0.5396	0.5412	0.5377		
5/8	0.6250	11	UNC	0.5660	0.5732	0.5714	0.5660	0.5619	0.5644	0.5589		
		18	UNF	0.5889	0.5949	0.5934	0.5889	0.5854	0.5875	0.5828		
		24	UNEF	0.5979	0.6031	0.6018	0.5979	0.5949	0.5967	0.5927		
11/16	0.6875	32	UN	0.6047	0.6093	0.6082	0.6047	0.6020	0.6036	0.6000		
		16	UN	0.6469	0.6531	0.6515	0.6469	0.6433	0.6455	0.6407		
		20	UN	0.6550	0.6606	0.6592	0.6550	0.6518	0.6537	0.6494		
3/4	0.7500	24	UNEF	0.6604	0.6656	0.6643	0.6604	0.6574	0.6592	0.6552		
		10	UNC	0.6850	0.6927	0.6907	0.6850	0.6806	0.6832	0.6773		
		16	UNF	0.7094	0.7159	0.7143	0.7094	0.7056	0.7079	0.7029		
		18	UNS	0.7139	0.7199	0.7184	0.7139	0.7104	0.7125	0.7079		
13/16	0.8125	20	UNEF	0.7175	0.7232	0.7218	0.7175	0.7142	0.7162	0.7118		
		32	UN	0.7297	0.7344	0.7333	0.7297	0.7270	0.7286	0.7250		
		16	UN	0.7719	0.7782	0.7766	0.7719	0.7683	0.7704	0.7655		
		18	UNS	0.7764	0.7824	0.7809	0.7764	0.7729	0.7750	0.7704		
				20	UNEF	0.7800	0.7857	0.7843	0.7800	0.7767	0.7787	0.7743

Standard Inch Pitch Diameters										
No. or Fraction	Decimal Size	T.P.I.		Work Plugs Class			Rings & Setting Plugs Class			
				Go Basic	2B HI	3B HI	3A Go	3A Lo	1A & 2A Go	2A Lo
7/8	0.8750	9	UNC	0.8028	0.8110	0.8089	0.8028	0.7981	0.8009	0.7946
		14	UNF	0.8286	0.8356	0.8339	0.8286	0.8245	0.8270	0.8216
		16	UN	0.8344	0.8407	0.8391	0.8344	0.8308	0.8329	0.8280
		18	UNS	0.8389	0.8449	0.8435	0.8389	0.8354	0.8375	0.8329
		20	UNEF	0.8425	0.8482	0.8468	0.8425	0.8392	0.8412	0.8368
15/16	0.9375	16	UN	0.8969	0.9034	0.9018	0.8969	0.8932	0.8954	0.8904
		20	UNEF	0.9050	0.9109	0.9094	0.9050	0.9016	0.9036	0.8991
1"	1.0000	8	UNC	0.9188	0.9276	0.9254	0.9188	0.9137	0.9168	0.9100
		12	UNF	0.9459	0.9535	0.9516	0.9459	0.9415	0.9441	0.9382
		14	UNS	0.9536	0.9605	0.9588	0.9536	0.9496	0.9520	0.9467
		16	UNS	0.9594	0.9659	0.9643	0.9594	0.9557	0.9579	0.9529
		20	UNEF	0.9675	0.9734	0.9719	0.9675	0.9641	0.9661	0.9616
1-1/16	1.0625	12	UN	1.0084	1.0158	1.0139	1.0084	1.0042	1.0067	1.0010
		18	UNEF	1.0264	1.0326	1.0310	1.0264	1.0228	1.0250	1.0203
1-1/8	1.1250	7	UNC	1.0322	1.0416	1.0393	1.0322	1.0268	1.0300	1.0228
		8	UN	1.0438	1.0528	1.0505	1.0438	1.0386	1.0417	1.0348
		12	UNF	1.0709	1.0787	1.0768	1.0709	1.0664	1.0691	1.0631
		16	UN	1.0844	1.0909	1.0893	1.0844	1.0807	1.0829	1.0779
		18	UNEF	1.0889	1.0951	1.0935	1.0889	1.0853	1.0875	1.0828
1-3/16	1.1875	12	UN	1.1334	1.1409	1.1390	1.1334	1.1291	1.1317	1.1259
		18	UNEF	1.1514	1.1577	1.1561	1.1514	1.1478	1.1499	1.1450
1-1/4	1.2500	7	UNC	1.1572	1.1668	1.1644	1.1572	1.1517	1.1550	1.1476
		8	UN	1.1688	1.1780	1.1757	1.1688	1.1635	1.1667	1.1597
		12	UNF	1.1959	1.2039	1.2019	1.1959	1.1913	1.1941	1.1879
		16	UN	1.2094	1.2160	1.2144	1.2094	1.2056	1.2079	1.2028
		18	UNEF	1.2139	1.2202	1.2186	1.2139	1.2103	1.2124	1.2075
1-5/16	1.3125	12	UN	1.2584	1.2659	1.2640	1.2584	1.2541	1.2567	1.2509
		18	UNEF	1.2764	1.2827	1.2811	1.2764	1.2728	1.2749	1.2700
1-3/8	1.3750	6	UNC	1.2667	1.2771	1.2745	1.2667	1.2607	1.2643	1.2563
		8	UN	1.2938	1.3031	1.3008	1.2938	1.2884	1.2916	1.2844
		12	UNF	1.3209	1.3291	1.3270	1.3209	1.3162	1.3190	1.3127
		16	UN	1.3344	1.3410	1.3394	1.3344	1.3306	1.3329	1.3278
		18	UNEF	1.3389	1.3452	1.3436	1.3389	1.3353	1.3374	1.3325
1-7/16	1.4375	12	UN	1.3834	1.3910	1.3891	1.3834	1.3790	1.3816	1.3757
		18	UNEF	1.4014	1.4079	1.4062	1.4014	1.3977	1.3999	1.3949
1-1/2	1.5000	6	UNC	1.3917	1.4022	1.3996	1.3917	1.3856	1.3893	1.3812
		8	UN	1.4188	1.4283	1.4259	1.4188	1.4133	1.4166	1.4093
		12	UNF	1.4459	1.4542	1.4522	1.4459	1.4411	1.4440	1.4376
		16	UN	1.4594	1.4662	1.4645	1.4594	1.4555	1.4578	1.4526
		18	UNEF	1.4639	1.4704	1.4687	1.4639	1.4602	1.4624	1.4574
1-9/16	1.5625	18	UNEF	1.5264	1.5329	1.5312	1.5264	1.5227	1.5249	1.5199
1-5/8	1.6250	8	UN	1.5438	1.5535	1.5510	1.5438	1.5382	1.5416	1.5342
		12	UN	1.5709	1.5785	1.5766	1.5709	1.5665	1.5691	1.5632
		18	UN	1.5844	1.5912	1.5895	1.5844	1.5805	1.5828	1.5776
1-11/16	1.6875	12	UN	1.6334	1.6412	1.6392	1.6334	1.6289	1.6316	1.6256
		16	UN	1.6469	1.6538	1.6521	1.6469	1.6429	1.6453	1.6400
		18	UNEF	1.6514	1.6580	1.6563	1.6514	1.6476	1.6499	1.6448
1-3/4	1.7500	8	UN	1.6688	1.6786	1.6762	1.6688	1.6631	1.6656	1.6590
		12	UN	1.6959	1.7037	1.7017	1.6959	1.6914	1.6941	1.6881
		16	UN	1.7094	1.7163	1.7146	1.7094	1.7054	1.7078	1.7025
1-7/8	1.8750	8	UN	1.7938	1.8038	1.8013	1.7938	1.7881	1.7915	1.7838
		12	UN	1.8209	1.8287	1.8267	1.8209	1.8164	1.8191	1.8131
		16	UN	1.8344	1.8413	1.8396	1.8344	1.8304	1.8328	1.8275
2"	2.0000	8	UN	1.9188	1.9289	1.9264	1.9188	1.9130	1.9165	1.9087
		12	UN	1.9459	1.9538	1.9518	1.9459	1.9414	1.9441	1.9380
		16	UN	1.9594	1.9664	1.9646	1.9594	1.9554	1.9578	1.9524

STANDARD METRIC PITCH DIAMETERS:
6H WORK PLUGS & 6G THREAD RINGS & SET PLUGS

Metric Pitch Diameters								
Basic	6H Work Thread Plugs				6g Rings & Setting Plugs			
	mm	Inch	mm	Inch	mm	Inch	mm	Inch
	Min. GO	Min. GO	Max HI	Max HI	Min. GO	Min. GO	Max LO	Max LO
M1.6 X .35	1.373	0.0541	1.458	0.0574	1.354	0.0533	1.291	0.0508
M2 X .4	1.740	0.0685	1.830	0.0721	1.721	0.0678	1.654	0.0651
M2.5 X .45	2.208	0.0869	2.303	0.0907	2.188	0.0861	2.117	0.0834
M3 X .5	2.675	0.1053	2.775	0.1093	2.655	0.1045	2.580	0.1016
M3.5 X .6	3.110	0.1224	3.222	0.1269	3.089	0.1216	3.004	0.1183
M4 X .7	3.545	0.1396	3.663	0.1442	3.523	0.1387	3.433	0.1352
M5 X .8	4.480	0.1764	4.605	0.1813	4.456	0.1754	4.361	0.1717
M6 X 1	5.350	0.2106	5.500	0.2165	5.324	0.2096	5.212	0.2052
M7 X 1	6.350	0.2500	6.500	0.2559	6.324	0.2490	6.212	0.2446
M8 X 1.25	7.188	0.2830	7.348	0.2893	7.160	0.2819	7.042	0.2772
M8 X 1	7.350	0.2894	7.500	0.2953	7.324	0.2884	7.212	0.2839
M10 X 1.5	9.026	0.3554	9.206	0.3624	8.994	0.3541	8.862	0.3489
M10 X 1.25	9.188	0.3617	9.348	0.3680	9.160	0.3606	9.042	0.3560
M10 X 1	9.350	0.3681	9.500	0.3740	9.324	0.3671	9.212	0.3627
M10 X .75	9.513	0.3745	9.645	0.3797	9.491	0.3737	9.391	0.3697
M12 X 1.75	10.863	0.4277	11.063	0.4356	10.829	0.4263	10.679	0.4204
M12 X 1.5	11.026	0.4341	11.216	0.4416	10.994	0.4328	10.854	0.4273
M12 X 1.25	11.188	0.4405	11.368	0.4476	11.160	0.4394	11.028	0.4342
M12 X 1	11.350	0.4469	11.510	0.4532	11.324	0.4458	11.206	0.4412
M14 X 2	12.701	0.5000	12.913	0.5084	12.663	0.4985	12.503	0.4922
M14 X 1.5	13.026	0.5128	13.216	0.5203	12.994	0.5116	12.854	0.5061
M14 X 1	13.350	0.5256	13.510	0.5319	13.324	0.5246	13.206	0.5199
M15 X 1	14.350	0.5650	14.510	0.5713	14.324	0.5639	14.206	0.5593
M16 X 2	14.701	0.5788	14.913	0.5871	14.663	0.5773	14.503	0.5710
M16 X 1.5	15.026	0.5916	15.216	0.5991	14.994	0.5903	14.854	0.5848
M16 X 1	15.350	0.6043	15.510	0.6106	15.324	0.6033	15.206	0.5987
M17 X 1	16.350	0.6437	16.510	0.6500	16.324	0.6427	16.206	0.6380
M18 X 1.5	17.026	0.6703	17.216	0.6778	16.994	0.6691	16.854	0.6635
M18 X 1	17.350	0.6831	17.510	0.6894	17.324	0.6821	17.206	0.6774
M20 X 2.5	18.376	0.7235	18.600	0.7323	18.334	0.7218	18.164	0.7151
M20 X 1.5	19.026	0.7491	19.216	0.7565	18.994	0.7478	18.854	0.7423
M20 X 1	19.350	0.7618	19.510	0.7681	19.324	0.7608	19.206	0.7561
M22 X 2.5	20.376	0.8022	20.600	0.8110	20.334	0.8006	20.164	0.7939
M22 X 1.5	21.026	0.8278	21.216	0.8353	20.994	0.8265	20.854	0.8210
M24 X 3	22.051	0.8682	22.316	0.8786	22.003	0.8663	21.803	0.8584
M24 X 2	22.701	0.8937	22.925	0.9026	22.663	0.8922	22.493	0.8856
M25 X 1.5	24.026	0.9459	24.226	0.9538	23.994	0.9447	23.844	0.9387
M27 X 3	25.051	0.9863	25.316	0.9967	25.003	0.9844	24.803	0.9765
M27 X 2	25.701	1.0119	25.925	1.0207	25.663	1.0104	25.493	1.0037
M30 X 3.5	27.727	1.0916	28.007	1.1026	27.674	1.0895	27.462	1.0812
M30 X 2	28.701	1.1300	28.925	1.1388	28.663	1.1285	28.493	1.1218
M30 X 1.5	29.026	1.1428	29.226	1.1506	28.994	1.1415	28.844	1.1356
M33 X 2	31.701	1.2481	31.925	1.2569	31.663	1.2466	31.493	1.2399
M36 X 4	33.402	1.3150	33.702	1.3269	33.342	1.3127	33.118	1.3039
M35 X 1.5	34.026	1.3396	34.226	1.3475	33.994	1.3384	33.844	1.3324
M36 X 3	34.051	1.3406	34.316	1.3510	34.003	1.3387	33.803	1.3308
M39 X 2	37.701	1.4843	37.925	1.4931	37.663	1.4828	37.493	1.4761

DESIGNATIONS	THREAD SERIES	ANSI/ASME REFERENCE
ACME-C	Acme Threads, centralizing	B1.5
ACME-G	Acme threads, general purpose (see also Stub Acme)	B1.5
AMO	American Standard microscope objective threads	B1.11
ANPT	Aeronautical National Form taper pipe threads	SAE AS71051
BUTT	Buttress threads, pull type	B1.9
PUSH-BUTT	Buttress threads, push type	B1.9
F-PTF	Dryseal fine taper pipe thread series	B1.20.3 Appendix C
M	Metric screw threads - M profile with basic ISO 68 Profile	B1.13M
MJ	Metric screw threads - MJ profile with rounded root of radius 0	B1.21M
MJS	Metric screw threads - MJ profile special series	B1.21M
	Class 5 interference fit external threads	B1.12
NC5HF	For driving in hard ferrous material of hardness over 160 Bhn	
NC5 CSF	For driving in copper alloy and soft ferrous material of 160 Bhn or less	
NC5 ONF	For driving in other nonferrous material (Nonferrous materials other than copper alloys), any hardness	
	Class 5 interference fit internal threads	B1.12
NC5 IF	Entire ferrous material range	
NC5 INF	Entire nonferrous material range	
NGO	National gas outlet threads (1)	ANSI/CGA V-1
NGS	National gas straight threads	ANSI/CGA V-1
NGT	National gas taper threads (see also SGT)	ANSI/CGA V-1
NH	American Standard hose coupling threads of full form	B1.20.7
NHR	American Standard hose coupling threads for garden hose applications	B1.20.7
NPSC	American Standard Straight pipe threads in pipe couplings	B1.20.3
NPSF	Dryseal American Standard fuel internal straight pipe threads	B1.20.1
NPSH	American Standard straight hose coupling threads for joining to American Standard taper pipe threads B1	B1.20.1
NPSI	Dryseal American Standard intermediate internal straight pipe threads	B1.20.3
NPSL	American Standard straight pipe threads for loose-fitting mechanical joints with locknuts	B1.20.1
NPSM	American Standard straight pipe threads for free-fitting mechanical joints for fixtures	B1.20.1
NPT	American Standard taper pipe threads for general use	B1.20.1
NPTF	Dryseal American Standard taper pipe threads	B1.20.3
PTF-SAE Short	Dryseal SAE short taper pipe threads	B1.20.3
PTF-SPL Short	Dryseal special short taper pipe threads	B1.20.3 Appendix C
S	ISO miniature screw threads	ISO 1501
SGT	Special gas taper threads	ANSI/CGA V-1
SPL-PTF	Dryseal special taper pipe threads	B1.20.3 Appendix C
Stub Acme	Stub Acme threads	B1.8
UN	Unified inch screw thread, constant-pitch series	B1.1
UNF	Unified inch screw thread, fine-pitch series	B1.1
UNEF	Unified inch screw thread, extra-fine pitch series	B1.1
UNJ	Unified inch screw thread, constant-pitch series, with rounded root of radius 0	B1.15
UNJC	Unified inch screw thread, coarse-pitch series, with rounded root of radius 0	B1.15
UNJF	Unified inch screw thread, fine-pitch series, with rounded root of radius 0	B1.15
UNJEF	Unified inch screw thread, extra-fine pitch series, with rounded root of radius 0	B1.15
UNR	Unified inch screw thread, constant-pitch series, with rounded root of radius not less than 0	B1.1
UNRC	Unified inch screw thread, coarse-thread series, with rounded root of radius not less than 0	B1.1
UNRF	Unified inch screw thread, fine-pitch series, with rounded root of radius not less than 0	B1.1
UNREF	Unified inch screw thread, extra-fine pitch series, with rounded root of radius not less than 0	B1.1
UNM	Unified miniature thread series	B1.10
UNS	Unified inch screw thread, special diameter pitch or length of engagement	B1.1
Notes:	(1) All threads, except NGO, are right hand, unless otherwise designated	
	(2) See also SAE AS8879, and ISO 3161	



H.E. Morse Co. Inc.
455 Douglas Avenue
Holland, Michigan 49424
616.396.4604
FAX: 616.396.0413