

# Class ZZ Set & Library Calibrations

## PIN GAGE SET CALIBRATIONS

Vermont Gage is pleased to offer Calibration Services for pin gage sets. This service is available for both new and used gage sets.

Your calibration readings are taken using a laser micrometer. The published repeatability specification for our lab micrometer is +/- .000005". Traceable to NIST through SI units.

Your gages are inspected per **ANSI/ASME B89.1.5**. Refer to paragraph 6.1.7 – **Recalibration of .0025/.005mm (.0001/.0002 in.) Pins or Pin Sets.**

"Due to typical usage and economics, recalibration of .0025/.005mm (.0001/.0002 in.) tolerance pins or pin sets requires only two measurements, 6.35mm (1/4") from each end, unless otherwise specified."

All gage readings along with size nominals are printed on a single gage set calibration. A pass/fail marker is also printed to quickly identify the status of each gage.

- **New and used gage set calibrations**
- **Laser precision measurements**
- **2) 4-place readings on Inch Sets**
- **2) 3-place readings on Metric Sets**
- **Pass/Fail Marker for each gage**
- **1 Calibration Certificate**
- **NIST traceable**
- **Competitive prices**

## INCH SETS [.001 INCREMENTS]

Range	Order No. New Gages	Price	Order No. Used Gages	Price
.0060" to .0600"	971202130	\$46.00	971202230	\$55.00
.0065" to .0605"	971402130	\$46.00	971402230	\$55.00
.0110" to .0600"	971204130	\$42.00	971204230	\$50.00
.0115" to .0605"	971404130	\$42.00	971404230	\$50.00
.0110" to .2500"	971206130	\$194.00	971206230	\$215.00
.0115" to .2505"	971406130	\$194.00	971406230	\$215.00
.0610" to .2500"	971208130	\$160.00	971208230	\$170.00
.0615" to .2505"	971408130	\$160.00	971408230	\$170.00
.2510" to .5000"	971210130	\$210.00	971210230	\$230.00
.2515" to .5005"	971410130	\$210.00	971410230	\$230.00
.5010" to .6250"	971212130	\$140.00	971212230	\$160.00
.5015" to .6255"	971412130	\$140.00	971412230	\$160.00
.6260" to .7500"	971214130	\$140.00	971214230	\$160.00
.6265" to .7505"	971414130	\$138.00	971414230	\$160.00
.7510" to .8320"	971216130	\$95.00	971216230	\$110.00
.7515" to .8325"	971416130	\$95.00	971416230	\$110.00
.8330" to .9160"	971218130	\$95.00	971218230	\$110.00
.8335" to .9165"	971418130	\$95.00	971418230	\$110.00
.9170" to 1.0000"	971220130	\$95.00	971220230	\$110.00
.9175" to 1.0005"	971420130	\$95.00	971420230	\$110.00
.0060" to .6250"	971222130	\$550.00	971222230	\$600.00
.0065" to .6255"	971422130	\$550.00	971422230	\$600.00
.0060" to .8320"	971224130	\$790.00	971224230	\$870.00
.0065" to .8325"	971424130	\$790.00	971424230	\$870.00
.0060" to 1.0000"	971226130	\$990.00	971226230	\$1,235.00
.0065" to 1.0005"	971426130	\$990.00	971426230	\$1,235.00
.0110" to .5005"	971227130	\$695.00	971227230	\$1,030.00
.0110" to .6250"	971228130	\$545.00	971228230	\$725.00
.0115" to .6255"	971428130	\$545.00	971428230	\$725.00
.0110" to .6255"	971229130	\$1,135.00	971229230	\$1,450.00
.0110" to .7500"	971230130	\$545.00	971230230	\$695.00
.0115" to .7505"	971430130	\$545.00	971430230	\$695.00
.0110" to .9160"	971232130	\$700.00	971232230	\$895.00
.0115" to .9165"	971432130	\$700.00	971432230	\$895.00
.0110" to 1.0000"	971234130	\$780.00	971234230	\$1,000.00
.0115" to 1.0005"	971434130	\$780.00	971434230	\$1,000.00
.0610" to .6255"	971235130	\$1,000.00	971235230	\$1,330.00
.0610" to .7500"	971236130	\$515.00	971236230	\$650.00
.0615" to .7505"	971436130	\$515.00	971436230	\$650.00
.0610" to .9160"	971238130	\$670.00	971238230	\$855.00
.0615" to .9165"	971438130	\$670.00	971438230	\$855.00
.0610" to 1.0000"	971240130	\$750.00	971240230	\$955.00
.0615" to 1.0005"	971440130	\$750.00	971440230	\$955.00
.2510" to .8320"	971242130	\$475.00	971242230	\$600.00
.2515" to .8325"	971442130	\$475.00	971442230	\$600.00
.2510" to 1.0000"	971244130	\$625.00	971244230	\$805.00
.2515" to 1.0005"	971444130	\$625.00	971444230	\$805.00
.5010" to .9160"	971246130	\$400.00	971246230	\$510.00
.5015" to .9165"	971446130	\$400.00	971446230	\$510.00
.5010" to 1.0000"	971248130	\$475.00	971248230	\$610.00
.5015" to 1.0005"	971448130	\$475.00	971448230	\$610.00
.6260" to 1.0000"	971250130	\$355.00	971250230	\$460.00
.6265" to 1.0005"	971450130	\$355.00	971450230	\$460.00
.7510" to 1.0000"	971252130	\$235.00	971252230	\$310.00
.7515" to 1.0005"	971452130	\$235.00	971452230	\$310.00

# Class ZZ Set & Library Calibrations

## METRIC SETS [0.02MM INCREMENTS]

Range	Order No. New Gages	Price	Order No. Used Gages	Price
0.20mm to 1.28mm	971602130	\$50.00	971602230	\$65.00
0.21mm to 1.29mm	971802130	\$50.00	971802230	\$65.00
1.30mm to 4.98mm	971604130	\$138.00	971604230	\$185.00
1.31mm to 4.99mm	971804130	\$138.00	971804230	\$185.00
5.00mm to 9.98mm	971606130	\$210.00	971606230	\$280.00
5.01mm to 9.99mm	971806130	\$210.00	971806230	\$280.00
10.00mm to 13.98mm	971608130	\$160.00	971608230	\$218.00
10.01mm to 13.99mm	971808130	\$160.00	971808230	\$218.00
14.00mm to 16.48mm	971610130	\$138.00	971610230	\$190.00
14.01mm to 16.49mm	971810130	\$138.00	971810230	\$190.00
16.50mm to 18.98mm	971612130	\$138.00	971612230	\$190.00
16.51mm to 18.99mm	971812130	\$138.00	971812230	\$190.00
19.00mm to 20.98mm	971614130	\$110.00	971614230	\$145.00
19.01mm to 20.99mm	971814130	\$110.00	971814230	\$145.00
21.00mm to 22.48mm	971616130	\$85.00	971616230	\$115.00
21.01mm to 22.49mm	971816130	\$85.00	971816230	\$115.00
22.50mm to 23.98mm	971618130	\$85.00	971618230	\$115.00
22.51mm to 23.99mm	971818130	\$85.00	971818230	\$115.00
24.00mm to 25.48mm	971620130	\$85.00	971620230	\$115.00
24.01mm to 25.49mm	971820130	\$85.00	971820230	\$115.00
0.20mm to 13.98mm	971622130	\$560.00	971622230	\$745.00
0.21mm to 13.99mm	971822130	\$560.00	971822230	\$745.00
0.20mm to 18.98mm	971624130	\$840.00	971624230	\$1,130.00
0.21mm to 18.99mm	971824130	\$840.00	971824230	\$1,130.00
0.20mm to 22.48mm	971626130	\$1,025.00	971626230	\$1,350.00
0.21mm to 22.49mm	971826130	\$1,025.00	971826230	\$1,350.00
0.20mm to 25.48mm	971628130	\$1,200.00	971628230	\$1,600.00
0.21mm to 25.49mm	971828130	\$1,200.00	971828230	\$1,600.00
1.30mm to 16.48mm	971630130	\$650.00	971630230	\$865.00
1.31mm to 16.49mm	971830130	\$650.00	971830230	\$865.00
1.30mm to 20.98mm	971632130	\$910.00	971632230	\$1,200.00
1.31mm to 20.99mm	971832130	\$910.00	971832230	\$1,200.00
1.30mm to 23.98mm	971634130	\$980.00	971634230	\$1,280.00
1.31mm to 23.99mm	971834130	\$980.00	971834230	\$1,280.00
1.30mm ot 25.48mm	971636130	\$1,065.00	971636230	\$1,400.00
1.31mm ot 25.49mm	971836130	\$1,065.00	971836230	\$1,400.00



# Cylindrical Certifications

## VERMONT GAGE CALIBRATIONS

Vermont Gage is proud to offer ISO 17025 A2LA accredited certifications and non-accredited certifications for Cylindrical fixed limit gages. Our calibration lab meets or exceeds the dimensional, humidity and temperature requirements per ISO 17025 and ANSI/NCCL Z540-1. We encourage you to visit the A2LA website to view the scope of our accreditations for both of our labs

**Certificate of Accredited Calibration**

**Customer:** XYZ Company  
Your Street  
Your Town, Your State, USA

**For Information Contact:** Vermont Gage  
P.O. Box 182, Swanton, VT 05488  
Tel: 800-421-4914  
Email: sales@vermont-gage.com

**Certification ID:** 123456  
**Customer PO#:** Sample 1  
**Re-Cal Date:**  
**Gage Condition:** New

**Date of Calibration:** 12/31/15  
**Control #:** 1234567  
**Unit of Measure:** Inch  
**Specifications Defined From:** ASME, B89.1.5-1998

**Gage Description:** STL XX GO/NOGO BUREAU ASSY FOR ACC 1.5530/1.5530

Comments	Specified Size	Tolerance Class XX	Front	Actual Readings	
				# deg.	98 deg.
Go Gage	1.553000	+ 0.000040	Front	1.553038	1.553029
			Center	1.553040	1.553040
			Back	1.553033	1.553029
No Go Gage	1.553000	- 0.000040	Front	1.554979	1.554973
			Center	1.554975	1.554971
			Back	1.554983	1.554983

Note: Measurements taken at center and 1/16" from end of top and bottom radius of handle. The "0 degree" reading is taken through the axis of the size. Marked end represents front of gage.

Calibration Procedure ID: QP 54.7 C-SMIC-035 Lab 100 Measurement Uncertainty 16 Micro inches

This is to certify that the gage described above has been calibrated and the measurements provided are traceable through an unbroken chain of calibrations to SI units through NIST. This laboratory is accredited to ISO 17025:2005 and ANSI/NCCL Z540-1-2004 by A2LA. This laboratory complies with ISO 10012:2003 and calibration procedure complies with the standard stated above. Accept reject decisions are based on Table 3 of the stated standard. Measurement of uncertainty is not considered in these decisions. Temperature of calibration is 68°F and relative humidity is <math>40\%</math>. Expanded uncertainty expressed at a 95% confidence level, using a coverage of K=2.

The stated calibration results have been determined to be in accordance with the laboratory's terms of accreditation, unless otherwise stated in the report. The calibration items are in no way approved or endorsed by A2LA.

This certificate is neither a claim nor a governmental representation. The manufacturer's responsibilities due to any defects or inaccuracies in any gage or in the certificate, shall in no event be for any cause whatsoever, exceed the purchase or price of the pertinent gage(s).

Inspected by: \_\_\_\_\_  
Inspector

This certificate shall not be reproduced except in full, without written approval of Vermont Gage.

Accredited ISO 17025:2005

## QUALITY POLICY FOR CALIBRATION LAB

The calibration lab is committed to achieving customer satisfaction by implementing a quality system compliant to the ISO 17025 standard. Through its quality system, the lab intends to provide accurate calibrations, timely deliveries, and efficient customer services.

This policy is implemented at Vermont Gage's Swanton, Vermont facility. The lab provides calibrations for fixed limit gages. This includes product produced at this facility, purchased gages, as well as, calibrations of used gages supplied by our customers.

All laboratory personnel, including management and technicians, are required to familiarize themselves with the quality and operational procedures generated by compliance with the ISO 17025 standard.



Certificate #2514.01

To view our Scope of Accreditation, go to:  
<http://www.a2la.org/scopepdf/2514-01.pdf>

# Cylindrical Certifications

## PLAIN PLUG GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
.0040" to .0100"	Calibration	973011100	\$15.00	973011200	\$20.00	0° Front, Center, Back
	Accredited	973011110	\$25.00	973011210	\$40.00	0° Front, Center, Back 90° Front, Center, Back
.0101" to 6.0000"	Calibration	973011120	\$12.50	973011220	\$20.00	0° Front, Center, Back
	Accredited	973011130	\$22.00	973011230	\$36.00	0° Front, Center, Back 90° Front, Center, Back

## PLAIN RING GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
.0600" to 2.0000"	Calibration	973511120	\$12.50	973511220	\$20.00	0° Front, Center, Back
	Accredited	973511130	\$22.00	973511230	\$36.00	0° Front, Center, Back 90° Front, Center, Back
2.0001" to 6.0000"	Calibration	973512120	\$15.00	973512220	\$20.00	0° Front, Center, Back
	Accredited	973512130	\$25.00	973512230	\$40.00	0° Front, Center, Back 90° Front, Center, Back
6.0001" to 12.2600"	Calibration	973513130	\$17.50	973513230	\$25.00	0° Front, Center, Back 90° Front, Center, Back

## MASTER SETTING DISCS

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
.1500" to 2.0000"	Calibration	974011120	\$12.50	974011220	\$20.00	0° Front, Center, Back
	Accredited	974011130	\$22.00	974011230	\$36.00	0° Front, Center, Back 90° Front, Center, Back
2.0001" to 6.0000"	Calibration	974012120	\$15.00	974012220	\$20.00	0° Front, Center, Back
	Accredited	974012130	\$25.00	974012230	\$40.00	0° Front, Center, Back 90° Front, Center, Back

## PROGRESSIVE & STEP GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
.1050" to 4.5100"	Calibration	974211120	\$22.00	974211220	\$32.00	0° Front, Center, Back
	Accredited	974211130	\$45.00	974211230	\$55.00	0° Front, Center, Back 90° Front, Center, Back

Pricing is calculated for each gage member.

Readings for one (1) assembly are printed on one (1) certificate.

Cylindrical gages are calibrated at 10 Precision Lane, Swanton, VT 05488

# Thread Certifications

## VERMONT GAGE CALIBRATIONS

Vermont Gage is proud to offer ISO 17025 A2LA accredited certifications and non-accredited certifications for Threaded and Hexagon fixed limit gages. Our calibration lab meets or exceeds the dimensional, humidity and temperature requirements per ISO 17025 and ANSI/NCSL Z540-1. We encourage you to visit the A2LA website to view the scope of our accreditations for our labs

**Vermont Thread Gage, LLC.**  
564 Reasonover Drive  
Franklin, Kentucky 42134

**ACCREDITED**  
Calibration Lab  
Cert 3821.01

**Certificate of Accredited Calibration**

**Customer:** XYZ Company  
Your Street  
Your Town, Your State, USA

**For Information Contact:**  
Vermont Gage  
P.O. Box 266, Swanton VT 05488  
Tel: 800-421-0914  
Email: sales@vtgage.com

**Certification ID:** 1234567  
**Customer PO#:** 12345678  
**Re-Cal Date:** New  
**Gage Condition:** New

**Date of Calibration:** 12/31/15  
**Control #:** 1234567  
**Unit of Measure:** Inch  
**Specifications Defined By:** ASME B1.2, 2003

**Gage Description:** 1/8-20 UNC-2B Tap/dieck Assembly  
**Comments:** (\*) Denotes Out of Tolerance

	G1 Member		G2 Member	
	Prescribed	Actual	Prescribed	Actual
Pitch Diameter (Front)	2175±0.003	0.2178	222±0.003	0.2224
Pitch Diameter (Center)	2175±0.003	0.2174	222±0.003	0.2224
Pitch Diameter (Back)	2175±0.003	0.2172	222±0.003	0.2223
Major Diameter (Front)	2500±0.005	0.2508	244±0.005	0.24406
Major Diameter (Back)	2500±0.005	0.2506	244±0.005	0.244
Lead Length	3050±0.003	0.3051	3050±0.003	0.3051
Flank Angle (Leading)	30°0'±0.1°	30°11'	30°0'±0.15'	30°2'
Flank Angle (Trailing)	30°0'±0.15'	30°0'	30°0'±0.15'	29°57'

**Reference Standards Used:** Gr. 0 Gage Blocks, Serial #: 1234567, Calibrated: 10-31-15, Due: 4-31-16

Equipment Used	Uncertainty	Cal Proc.
Major Diameter	0.000043	QCP-001
Pitch Diameter	0.000095	QCP-002
Lead	0.000130	QCP-004
Flank Angles	4.3'	QCP-005

This is to certify that the gage described above has been calibrated and the measurements provided are traceable through an unbroken chain of calibrations to SI units through NIST. This laboratory is accredited to ISO 17025:2005 and ANSI/NCSL Z540-1:1994 by A2LA. This laboratory complies with ISO 10012:2003.

Temperature at calibration is 68.2° F and relative humidity is <math>\leq 50\%</math>. Expanded uncertainty represents 95% confidence level, using a coverage of k=2. The stated calibration results have been determined to be in accordance with the laboratory's terms of accreditation, unless otherwise stated in the report. The calibrated items are in no way approved or endorsed by A2LA.

This certificate is neither a contract nor a contractual representation. The manufacturer's responsibility for any defects or inaccuracies in any gage or in the certificate, shall in no event rest for any cause whatsoever, except the purchase or price of the pertinent gage(s).

Certifier: \_\_\_\_\_ Inspector: \_\_\_\_\_

This certificate shall not be reproduced except in full, without written approval of Vermont Thread Gage, LLC.

Accredited ISO 17025:2005

## QUALITY POLICY FOR CALIBRATION LAB

The calibration lab of Vermont Thread Gage, LLC. is committed to achieving customer satisfaction by providing accurate calibrations, timely deliveries, and efficient customer services to the highest standards of quality. This is achieved by implementing and maintaining a quality system in compliance with the ISO 17025 standard, by maintaining good professional practices at all times and by continual improvement of this system.

In order to fulfill our customer's needs, top management shall assure that these needs are determined and converted into requirements, and all laboratory personnel, including management and technicians, shall familiarize themselves with the quality and operational procedures and shall implement said policies and procedures in their work.

This policy is implemented at VTGs Franklin, KY facility. The lab provides calibrations for product produced at this facility, as well as calibrations for gages provided by commercial customers.



Certificate #3821.01

To view our Scope of Accreditation, go to:  
<http://www.a2la.org/scopepdf/3821-01.pdf>

# Thread Certifications

## STRAIGHT THREAD PLUG GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
#0 to 1.5000"	Calibration	974511120	\$17.50	974511220	\$27.50	2 OD, 3 PD
	Accredited	974511130	\$28.00	974511230	\$48.00	2 OD, 3 PD, 1 Lead, 2 Flank Angles
1.5001" to 4.0000"	Calibration	974511140	\$20.00	974511240	\$30.00	2 OD, 3 PD
	Accredited	974511150	\$34.00	974511250	\$54.00	2 OD, 3 PD, 1 Lead, 2 Flank Angles
4.0001" to 12.0000"	Calibration	974511160	\$25.00	974511260	\$36.00	2 OD, 3 PD
	Accredited	974511170	\$36.00	974511270	\$60.00	2 OD, 3 PD, 1 Lead, 2 Flank Angles

## THREAD RING GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
#0 - 1.5000" (Standard)	Calibration	975511120	\$17.50	975511220	\$29.50	PD as Found, PD as Left, ID
	Accredited	975511130	\$28.00	975511230	\$48.00	
#0 - 1.5000" (non-Standard)	Calibration	975511140	\$20.00	975511240	\$38.00	PD as Found, PD as Left, ID
	Accredited	975511150	\$35.00	975511250	\$65.00	
1.50001" to 4.0000"	Calibration	975511160	\$25.00	975511260	\$41.00	PD as Found, PD as Left, ID
	Accredited	975511170	\$46.00	975511270	\$76.00	
4.0001" to 12.0000"	Calibration	975511180	\$35.00	975511280	\$45.00	PD as Found, PD as Left, ID
	Accredited	975511190	\$56.00	975511290	\$90.00	

## TAPERED PIPE THREAD PLUG GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
1/16" to 2"	Calibration	976011120	\$32.00	976011220	\$42.00	OD, PD, Taper, Step, Length.
	Accredited	976011130	\$46.00	976011230	\$56.00	OD, PD, Lead, 2 Flank Angles, Taper, Step Length
2 1/2" to 6"	Calibration	976011140	\$36.00	976011240	\$46.00	OD, PD, Taper, Step, Length.
	Accredited	976011150	\$50.00	976011250	\$65.00	OD, PD, Lead, 2 Flank Angles, Taper, Step Length

## TAPERED PIPE THREAD RING GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
1/16" to 2"	Calibration	976511120	\$32.00	976511220	\$57.00	PD Standoff, ID Standoff, Length
	Accredited	976511130	\$46.00	976511230	\$72.00	PD Standoff, ID Standoff, Length
2 1/2" to 6"	Calibration	976511140	\$36.00	976511240	\$60.00	PD Standoff, ID Standoff, Length
	Accredited	976511150	\$50.00	976511250	\$75.00	PD Standoff, ID Standoff, Length

## MEASURING WIRES - GEAR WIRES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
All	Calibration	975011130	\$27.00	975011230	\$40.00	Average Ø, Constant (60° Only)

## HEX GAGES

Range	Type of Certificate	Order No. New Gages	Price	Order No. Used Gages	Price	Number of Readings
.0280" to 3.0000"	Calibration	974411120	\$22.00	974411220	\$34.00	Based on Diameter, Length, and Style. Please contact customer service for more information
	Accredited	974411130	\$44.00	974411230	\$72.00	

Pricing is calculated for each individual gage member.

Readings for one (1) assembly are printed on one (1) certificate.

Threaded gages are calibrated at 564 Reasonover Drive, Franklin, KY 42134

# Measurement Conflict Resolution



## VERMONT GAGE HAS ADOPTED THE MEASUREMENT DISPUTE RESOLUTION METHODS ENDORSED BY THE AMTMA.

"Disputes over measurements can be costly for both parties to resolve and may hinder ongoing relations between suppliers and users of gages and instruments. Often it is simpler for both parties to agree to accept an average value of their readings as the final 'size' or the point at which their readings plus measurements uncertainties overlap.

The obvious way to avoid such problems is to agree beforehand on a method that will be used to resolve them if they arise. Often, the degree of separation between the readings dictate the best approach to take. Where the uncertainty of each party is significantly different, the party with the lowest uncertainty in the calibration would be considered more reliable.

The AMTMA offers the following methods as options you can choose from. If the Referee Method fails to bring a resolution, then the Universal Standard Method should be used due to the fact it is technically based and internationally accepted by metrologists in all disciplines."

### THE REFEREE METHOD

The two parties agree on a third party to provide a referee measurement that it is agreed will be considered as the actual value. An alternative on this is where the reading by either party that is closest to that provided by the referee is considered the acceptable value.

Other variations of this method include averaging the readings of three or more laboratories and may also include the readings produced by the parties to the dispute.

Unless otherwise agreed to, the cost of using outside laboratories in this method are paid by the losing party.

### THE UNIVERSAL STANDARD METHOD

National and international standards agencies have produced methods of resolving measurement disputes that focus on the uncertainty budgets of those that have produced the measurements. The advantage of this method is that its technical base tends to remove personalities from the equation and may indicate that neither party to a dispute has the capability required to resolve it.

Using this method, the onus of proving a measurement falls on the party that has questioned the results of calibration. If requested, this party must provide a copy of their uncertainty budget for the measurement to the other party for review. Budgets from both parties should be compared. Such a review should focus on seeking agreement between both parties respecting each element included in the budget since it will rarely, if ever, be all right or all wrong. The mathematics should take care of the rest. There may be cases where one or more elements have not been included in the budget and when they are, the outcome changes significantly.

In the event one or more assumptions in the budget cannot be resolved, a third party can be asked to provide an opinion on them."

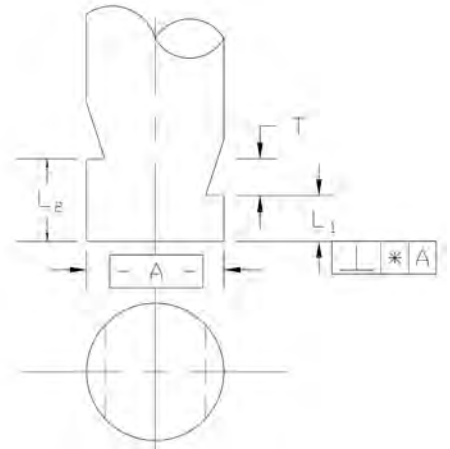
# Depth Notches & Pressure Relief Flats

## DEPTH NOTCHES

### **Gage hole diameter and depth.**

Depth notches can be added to reversible cylindrical style gages to gage hole depth as well as diameter. Length tolerances from .0005". Available on plug gage sizes .050" diameter and larger.

Dimensions	
A	Gage Diameter
L1	Go Depth Notch
L2	NoGo Depth Notch
T	Depth Tolerance



Range Notch Tolerance	Range Member Length	Price Go Depth Notch	Price Go/NoGo Depth Notches
.0005" to .0010"	Up to 2.0000"	Add \$32.00	Add \$55.00
.0005" to .0010"	2.0001" to 4.0000"	Add \$45.00	Add \$75.00
.0005" to .0010"	4.0001" to 6.0000"	Add \$58.00	Add \$95.00
.0005" to .0010"	6.0001"-11.5000"	Add \$75.00	Add \$120.00
.001" and over	Up to 2.0000"	Add \$28.00	Add \$45.00
.001" and over	2.0001" to 4.0000"	Add \$38.00	Add \$65.00
.001" and over	4.0001" to 6.0000"	Add \$48.00	Add \$80.00
.001" and over	6.0001"-11.5000"	Add \$60.00	Add \$100.00

Contact Customer Service for pricing on Carbide.

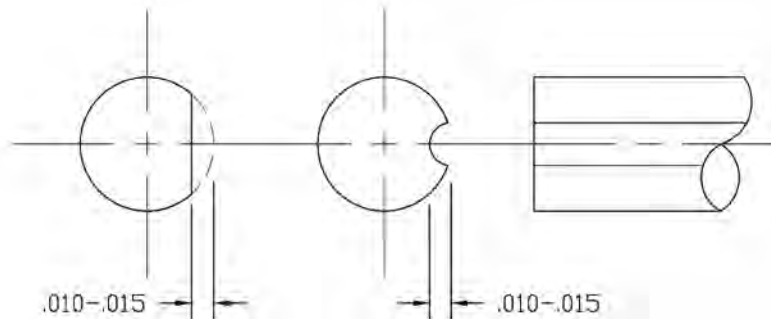
## PRESSURE RELIEF FLATS

### **Allows air or fluid to escape.**

Pressure relief flats can be added to reversible cylindrical style gages to allow air or fluid to escape when gaging blind holes. Depth of flat is .010" to .015".

Price Gage Length up to 2"	Price Gage Length up to 4"	Price Gage Length up to 6"	Price Gage Length up to 12"
\$22.00	\$30.00	\$37.00	\$48.00

Contact Customer Service for pricing on Carbide.  
Excludes XX tolerance.





# Gage Fact Sheet

## What are Gages used for?

Fixed limit gages are primarily used to check dimensions and geometries; plug gages check internal and ring gages external dimensions and geometries. They effectively ensure that a part being measured is within its designed tolerance limits. Fixed limit gages are highly accurate, economical and easy to use.

## Principles of Go/NoGo Gaging

To use as a "Go/NoGo" functional check, try and fit both the "Go" and "NoGo" gages into or onto a part being measured. The measured part passes if the "Go" gage fits and the "NoGo" doesn't, otherwise the part fails. A "Go/NoGo" check is strictly a pass/fail test. The actual part size is never measured.

## Types of Fixed Limit Gages

Plug gages are available in two types, plain cylindrical and thread, and in several popular styles: reversible, taperlock and trilock. Style is usually determined by the size of the gage. Ring gages are also available as plain cylindrical and thread type gages.

## Wear Resistance and Tolerance

Gages are available in tool steel, Black Guard™, chrome plate, and carbide. Chrome plate and carbide are harder and therefore provide additional wear resistance. A choice of tolerance is also available. See chart for explanation of Gagemaker's tolerances.

## Calculate Gage Tolerance

Normal practice for determining gage tolerance is to allow 10% of product tolerance to be divided between the "Go" and "NoGo"

## GAGEMAKER'S TOLERANCE CHART (ASME B89.1.5)

Diameter Range	XXX	XX	X	Y	Z	ZZ
Above - Including Inch						
.010" - .825"	.000010"	.000020"	.000040"	.000070"	.0001"	.0002"
.825" - 1.510"	.000015"	.000030"	.000060"	.000090"	.00012"	.00024"
1.510" - 2.510"	.000020"	.000040"	.000080"	.00012"	.00016"	.00032"
2.510" - 4.510"	.000025"	.000050"	.0001"	.00015"	.0002"	.0004"
4.510" - 6.510"	.000033"	.000065"	.00013"	.00019"	.00025"	.0005"
6.510" - 9.010"	.000040"	.000080"	.00016"	.00024"	.00032"	.00064"
9.010" - 12.010"	.000050"	.0001"	.0002"	.0003"	.0004"	.0008"
Metric						
.254mm - 20.96mm	.00025mm	.00051mm	.00102mm	.00178mm	.00254mm	.00508mm
20.96mm - 38.35mm	.00038mm	.00076mm	.00152mm	.00229mm	.00305mm	.00610mm
38.35mm - 63.75mm	.00051mm	.00102mm	.00203mm	.00305mm	.00406mm	.00813mm
63.75mm - 114.55mm	.00064mm	.00127mm	.00254mm	.00381mm	.00508mm	.01016mm
114.55mm - 165.35mm	.00084mm	.00165mm	.00330mm	.00483mm	.00635mm	.01270mm
165.35mm - 228.85mm	.00102mm	.00203mm	.00406mm	.00610mm	.00813mm	.01626mm
228.85mm - 305.05mm	.00127mm	.00254mm	.00508mm	.00762mm	.01016mm	.02032mm

gages. For plug gages "Go" is normally a plus tolerance and "NoGo" a minus tolerance. For ring gages the opposite is true; "Go" is normally a minus tolerance and "NoGo" a plus tolerance.

Using this practice as a guideline, gage tolerance is always included in the part tolerance and accounts for up to 10%. This means that 10% of good product could potentially fail the inspection but that no bad product would ever pass!

## Care and Use of Gages

- 1.) Dimensions to be gaged must be cleaned and free from burrs to prevent gaging interference.
- 2.) Gage should be turned slowly into or onto the part being checked. The fit should be snug but not forced. Air flats on a "Go" gage can facilitate the inspection of blind holes where air pressure is a problem.
- 3.) Temperature of the gage and the part should be the same. This is because of the effects of thermal

expansion on material. The normal temperature at which gages are calibrated is 68 degrees Fahrenheit. This is therefore the best temperature at which both part and gage should be when inspected. This effectively eliminates any error due to thermal expansion.

- 4.) Gages should be protected from exposure to excessive heat, moisture, and corrosive chemicals. After use, gages should be cleaned and then coated with a thin-film rust preventative and stored properly.
- 5.) Gages should be periodically calibrated to ensure accuracy. Gages and "Go" gages in particular, will wear with normal use and require recalibration. Frequency of calibration is dependent on such factors as frequency of use, part abrasiveness, tolerance, and applicable quality procedures. All gages should be monitored and maintained accordingly.