

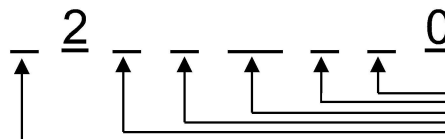
Custom Economy Step Gages/Check Gages

CHECK GO & NOGO TOLERANCE SIMULTANEOUSLY

Step Plug Gages have two gaging diameters to allow checking of Go and NoGo tolerances simultaneously or for checking stepped ID's.

- **Class ZZ (.0002" or .005mm) or Class Z (.0001" or .0025mm)**
- **NIST traceable**
- **52100 Tool Steel; 60/65 Rc**
- **2" OAL members**
- **10 microinch finish or better**
- **Round within 1/2 of tolerance**
- **Custom Markings, 1 line (up to 25 characters) included, additional text quoted upon request**
- **Inch handles – light blue**
- **Metric handles – yellow**
- **Other classes available, refer to Progressive design on pages 24-25**
- **Certificate of Accuracy included**
- **See page 111 for Calibration Services**

How To Order:



Finish

- [1] Tool Steel
- [9] Black Guard™

Scale

- [1] Inch
- [2] Metric

Tolerance

- [1] Class Z
- [2] Class ZZ

Range

- | | |
|------------------------|----------------------|
| [01] .0610" to .0750" | [1.54mm to 1.90mm] |
| [02] .0751" to .1800" | [1.91mm to 4.56mm] |
| [03] .1801" to .2810" | [4.57mm to 7.14mm] |
| [04] .2811" to .4060" | [7.15mm to 10.30mm] |
| [05] .4061" to .5100" | [10.31mm to 12.94mm] |
| [06] .5101" to .6350" | [12.95mm to 16.12mm] |
| [07] .6351" to .7600" | [16.13mm to 19.30mm] |
| [08] .7601" to .8320" | [19.31mm to 21.13mm] |
| [09] .8321" to 1.0050" | [21.14mm to 25.52mm] |

Direction of Tolerance

- [1] Pin diameter Minus, Step diameter Plus
- [2] Pin diameter Minus, Step diameter Minus
- [3] Pin diameter Plus, Step diameter Plus
- [4] Pin diameter Plus, Step diameter Minus

Package

- [1] Member Only
- [2] Single-End Assembly
 - [1 member, single-end handle, green cap]
- [3] Single-End Assembly
 - [1 member, single-end handle, red cap]

Size (Specify size of gage members)

When ordering, configure part number and add size of gage members.

Example: 121202110 - Pin .1750"/Step .1680"

Handle Marking:

(up to 25 characters included at no charge)

Custom Economy Step Gages/Check Gages

Range	Tolerance Class	Max Step	Step Length	Steel		Black Guard™	
				Price Member	Price Single-End Assembly	Price Member	Price Single-End Assembly
.0610" to .0750" 1.54mm to 1.90mm [01]	Z	.030	1/2"	\$75.00	\$85.75	\$80.00	\$90.75
	ZZ	.030	1/2"	\$44.00	\$54.75	\$50.00	\$60.75
.0751" to .1800" 1.91mm to 4.56mm [02]	Z	.050	1/2"	\$75.00	\$85.75	\$80.00	\$90.75
	ZZ	.050	1/2"	\$44.00	\$54.75	\$50.00	\$60.75
.1801" to .2810" 4.57mm to 7.14mm [03]	Z	.100	1/2"	\$76.00	\$88.25	\$83.00	\$95.25
	ZZ	.100	1/2"	\$45.00	\$57.25	\$51.00	\$63.25
.2811" to .4060" 7.15mm to 10.30mm [04]	Z	.100	3/4"	\$76.00	\$88.75	\$83.00	\$95.75
	ZZ	.100	3/4"	\$45.00	\$57.75	\$51.00	\$63.75
.4061" to .5100" 10.31mm to 12.94mm [05]	Z	.100	3/4"	\$77.00	\$92.25	\$84.00	\$99.25
	ZZ	.100	3/4"	\$49.00	\$64.25	\$54.00	\$69.25
.5101" to .6350" 12.95mm to 16.12mm [06]	Z	.150	3/4"	\$80.00	\$98.50	\$88.00	\$106.50
	ZZ	.150	3/4"	\$61.00	\$79.50	\$67.00	\$85.50
.6351" to .7600" 16.13mm to 19.30mm [07]	Z	.150	1"	\$83.00	\$103.50	\$91.00	\$111.50
	ZZ	.150	1"	\$61.00	\$81.50	\$67.00	\$87.50
.7601" to .8320" 19.31mm to 21.20mm [08]	Z	.150	1"	\$83.00	\$109.50	\$91.00	\$117.50
	ZZ	.150	1"	\$61.00	\$87.50	\$67.00	\$93.50
.8321" to 1.0050" 21.21mm to 25.52mm [09]	Z	.150	1"	\$90.00	\$116.50	\$98.00	\$124.50
	ZZ	.150	1"	\$74.00	\$100.50	\$80.00	\$106.50



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.