

# Custom Reversibles from .0040" to 1.0100"

## REVERSIBLES FOR LONGER GAGE LIFE

When one end becomes worn out of tolerance, you can reverse the gage and use the other end. This significantly increases gage life. Vermont Gage's Reversible Plug Gages feature 2" of actual gaging surface. This is crucial for gaging holes of varying depths. These custom plug gages can be assembled with a handle and marked with your tool number. The single-end and double-end assemblies include 1 line (up to 25 characters) of custom marking. These reversible plug gages are available up to 1" in several class tolerances and materials to meet your unique requirements. If you are looking for standard Class X Gage members, see pages 8-9 for best price and how to order.

- **Class XX, X, Y, Z or ZZ**
- **See page 116 for tolerance specifications**
- **Go, NoGo or Master tolerances**
- **NIST traceable**
- **Tool Steel; 60/65 Rc (Cold Stabilized)**
- **Chrome Plated Tool Steel; 70/72 Rc**
- **2" long**
- **4 microinch finish or better on Class XX or X**
- **Handles custom marked 1 line (up to 25 characters) included, additional text quoted upon request**
- **Inch handles – light blue**
- **Metric handles – yellow**
- **Certificate of Accuracy included**
- **See page 111 for Calibration Services**

### How to Order:

16      0

#### Material

- [1] Tool Steel
- [2] Chrome Plated Tool Steel
- [4] Black Guard™

#### Tolerance

- [1] Class XX
- [2] Class X
- [3] Class Y
- [4] Class Z
- [5] Class ZZ

#### Range

- |                        |                        |
|------------------------|------------------------|
| [01] .0040" to .0150"  | [0.101mm to 0.381mm]   |
| [02] .0151" to .0300"  | [0.382mm to 0.762mm]   |
| [03] .0301" to .0750"  | [0.763mm to 1.905mm]   |
| [04] .0751" to .1800"  | [1.906mm to 4.572mm]   |
| [05] .1801" to .2810"  | [4.573mm to 7.137mm]   |
| [06] .2811" to .4060"  | [7.138mm to 10.312mm]  |
| [07] .4061" to .5100"  | [10.313mm to 12.954mm] |
| [08] .5101" to .6350"  | [12.955mm to 16.129mm] |
| [09] .6351" to .7600"  | [16.130mm to 19.304mm] |
| [10] .7601" to 1.0100" | [19.305mm to 25.654mm] |

#### Direction of Tolerance

- [1] Go [1 member, (Plus) unilateral tolerance]
- [2] NoGo [1 member, (Minus) unilateral tolerance]
- [3] Master [1 member, bilateral tolerance]
- [4] Go/NoGo [2 members, (1) Plus, (1) Minus tolerance]

#### 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]
- [4] Double-End Assembly  
[2 members, double-end handle, green & red cap]

#### Size (Specify size of gage members)

Configure part number and add size of gage members.  
Example: **161205440 - Go .2480"/NoGo .2520"**

#### Handle Marking:

(up to 25 characters included at no charge)

# Custom Reversibles from .0040" to 1.0100"

| Range                                                                           | Tolerance<br>Class | Steel                   |                                 |                                 | Chrome                  |                                 |                                 | Tolerance<br>Class | Black Guard™            |                                 |                                 |
|---------------------------------------------------------------------------------|--------------------|-------------------------|---------------------------------|---------------------------------|-------------------------|---------------------------------|---------------------------------|--------------------|-------------------------|---------------------------------|---------------------------------|
|                                                                                 |                    | Price<br>Member<br>Only | Price<br>Single-End<br>Assembly | Price<br>Double-End<br>Assembly | Price<br>Member<br>Only | Price<br>Single-End<br>Assembly | Price<br>Double-End<br>Assembly |                    | Price<br>Member<br>Only | Price<br>Single-End<br>Assembly | Price<br>Double-End<br>Assembly |
| .0040" to .0150"<br>0.101mm to 0.381mm<br>[01]                                  | XX                 | \$70.00                 | \$80.75                         | \$154.50                        |                         |                                 |                                 | Z<br>ZZ            | \$32.00<br>\$26.00      | \$42.75<br>\$36.75              | \$78.50<br>\$66.50              |
|                                                                                 | X                  | \$47.00                 | \$57.75                         | \$108.50                        |                         |                                 |                                 |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$35.00                 | \$45.75                         | \$84.50                         |                         |                                 |                                 |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$22.00                 | \$32.75                         | \$58.50                         |                         |                                 |                                 |                    |                         |                                 |                                 |
| .0151" to .0300"<br>0.382mm to 0.762mm<br>[02]                                  | XX                 | \$48.00                 | \$58.75                         | \$110.50                        |                         |                                 |                                 | Z<br>ZZ            | \$24.00<br>\$22.00      | \$34.75<br>\$32.75              | \$62.50<br>\$58.50              |
|                                                                                 | X                  | \$31.00                 | \$41.75                         | \$76.50                         |                         |                                 |                                 |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$24.00                 | \$34.75                         | \$62.50                         |                         |                                 |                                 |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$19.00                 | \$29.75                         | \$52.50                         |                         |                                 |                                 |                    |                         |                                 |                                 |
| .0301" to .0750"<br>0.763mm to 1.905mm<br>[03]<br>(Chrome available over .040") | XX                 | \$30.00                 | \$40.75                         | \$74.50                         | \$45.00                 | \$55.75                         | \$104.50                        | Z<br>ZZ            | \$17.00<br>\$15.00      | \$27.75<br>\$25.75              | \$48.50<br>\$44.50              |
|                                                                                 | X                  | \$20.00                 | \$30.75                         | \$54.50                         | \$30.00                 | \$40.75                         | \$74.50                         |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$15.00                 | \$25.75                         | \$44.50                         | \$25.00                 | \$35.75                         | \$64.50                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$13.00                 | \$23.75                         | \$40.50                         | \$22.00                 | \$32.75                         | \$58.50                         |                    |                         |                                 |                                 |
| .0751" to .1800"<br>1.906mm to 4.572mm<br>[04]                                  | XX                 | \$32.00                 | \$42.75                         | \$78.50                         | \$48.00                 | \$58.75                         | \$110.50                        | Z<br>ZZ            | \$16.00<br>\$14.00      | \$26.75<br>\$24.75              | \$46.50<br>\$42.50              |
|                                                                                 | X                  | \$21.00                 | \$31.75                         | \$56.50                         | \$31.50                 | \$42.25                         | \$77.50                         |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$15.00                 | \$25.75                         | \$44.50                         | \$28.00                 | \$38.75                         | \$70.50                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$12.00                 | \$22.75                         | \$38.50                         | \$22.00                 | \$32.75                         | \$58.50                         |                    |                         |                                 |                                 |
| .1801" to .2810"<br>4.573mm to 7.137mm<br>[05]                                  | XX                 | \$34.00                 | \$46.25                         | \$84.00                         | \$51.00                 | \$63.25                         | \$118.00                        | Z<br>ZZ            | \$16.00<br>\$14.00      | \$28.25<br>\$26.25              | \$48.00<br>\$44.00              |
|                                                                                 | X                  | \$24.00                 | \$36.25                         | \$64.00                         | \$36.00                 | \$48.25                         | \$88.00                         |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$19.00                 | \$31.25                         | \$54.00                         | \$29.00                 | \$41.25                         | \$74.00                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$12.00                 | \$24.25                         | \$40.00                         | \$23.00                 | \$35.25                         | \$62.00                         |                    |                         |                                 |                                 |
| .2811" to .4060"<br>7.138mm to 10.312mm<br>[06]                                 | XX                 | \$35.00                 | \$47.75                         | \$86.50                         | \$52.50                 | \$65.25                         | \$121.50                        | Z<br>ZZ            | \$16.00<br>\$14.00      | \$28.75<br>\$26.75              | \$48.50<br>\$44.50              |
|                                                                                 | X                  | \$25.00                 | \$37.75                         | \$66.50                         | \$37.50                 | \$50.25                         | \$91.50                         |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$20.00                 | \$32.75                         | \$56.50                         | \$31.00                 | \$43.75                         | \$78.50                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$12.00                 | \$24.75                         | \$40.50                         | \$24.00                 | \$36.75                         | \$64.50                         |                    |                         |                                 |                                 |
| .4061" to .5100"<br>10.313mm to 12.954mm<br>[07]                                | XX                 | \$36.00                 | \$51.25                         | \$91.00                         | \$54.00                 | \$69.25                         | \$127.00                        | Z<br>ZZ            | \$17.00<br>\$15.00      | \$32.25<br>\$30.25              | \$53.00<br>\$49.00              |
|                                                                                 | X                  | \$27.00                 | \$42.25                         | \$73.00                         | \$40.50                 | \$55.75                         | \$100.00                        |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$20.00                 | \$35.25                         | \$59.00                         | \$32.00                 | \$47.25                         | \$83.00                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$13.00                 | \$28.25                         | \$45.00                         | \$25.00                 | \$40.25                         | \$69.00                         |                    |                         |                                 |                                 |
| .5101" to .6350"<br>12.955mm to 16.129mm<br>[08]                                | XX                 | \$39.00                 | \$57.50                         | \$101.50                        | \$58.50                 | \$77.00                         | \$140.50                        | Z<br>ZZ            | \$18.00<br>\$16.00      | \$36.50<br>\$34.50              | \$59.50<br>\$55.50              |
|                                                                                 | X                  | \$29.00                 | \$47.50                         | \$81.50                         | \$43.50                 | \$62.00                         | \$110.50                        |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$24.00                 | \$42.50                         | \$71.50                         | \$36.00                 | \$54.50                         | \$95.50                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$14.00                 | \$32.50                         | \$51.50                         | \$26.00                 | \$44.50                         | \$75.50                         |                    |                         |                                 |                                 |
| .6351" to .7600"<br>16.130mm to 19.304mm<br>[09]                                | XX                 | \$41.00                 | \$61.50                         | \$107.50                        | \$61.50                 | \$82.00                         | \$148.50                        | Z<br>ZZ            | \$22.00<br>\$19.00      | \$42.50<br>\$39.50              | \$69.50<br>\$63.50              |
|                                                                                 | X                  | \$31.00                 | \$51.50                         | \$87.50                         | \$46.50                 | \$65.50                         | \$115.50                        |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$25.00                 | \$45.50                         | \$75.50                         | \$37.50                 | \$56.50                         | \$97.50                         |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$17.00                 | \$37.50                         | \$59.50                         | \$30.00                 | \$50.50                         | \$85.50                         |                    |                         |                                 |                                 |
| .7601" to 1.0100"<br>19.305mm to 25.654mm<br>[10]                               | XX                 | \$63.00                 | \$89.50                         | \$158.00                        | \$94.50                 | \$121.00                        | \$221.00                        | Z<br>ZZ            | \$23.00<br>\$21.00      | \$49.50<br>\$47.50              | \$78.00<br>\$74.00              |
|                                                                                 | X                  | \$40.00                 | \$66.50                         | \$112.00                        | \$63.00                 | \$89.50                         | \$158.00                        |                    |                         |                                 |                                 |
|                                                                                 | Y                  | \$31.00                 | \$57.50                         | \$94.00                         | \$57.00                 | \$83.50                         | \$146.00                        |                    |                         |                                 |                                 |
|                                                                                 | Z,ZZ               | \$19.00                 | \$45.50                         | \$70.00                         | \$51.00                 | \$77.50                         | \$134.00                        |                    |                         |                                 |                                 |

## QTY DISCOUNTS

2 pcs. & Up... Less 10%  
Combine identical sizes  
for quantity discount  
(Excludes Class XX products)



# 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.