



# RELIABLE IN THE MOST RUGGED ENVIRONMENTS

**HIGH PERFORMANCE.  
GEARLESS, DIRECT DRIVE DESIGN.**



**PERMA-CAL® INDUSTRIES, INC.  
PRESSURE GAUGES**

**P R O D U C T   C A T A L O G**

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**SCAN TO WATCH  
OUR EXTREME  
DEMOS**

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## SOLVING YOUR TOUGHEST PRESSURE MEASUREMENT PROBLEMS SINCE 1980

Perma-Cal® has been a leader in quality and design of Direct Drive Pressure Gauges since 1980. Reliable in the most rugged environments, Perma-Cal® gauges are designed to withstand hostile applications, including intense vibration, pulsation, shock and over-pressure.

Originally, the Perma-Cal® product line was a division of the American Standard Corporation located in Monrovia, CA. In the early 1970's, American Standard was purchased by HTL Industries which subsequently sold the Perma-Cal® product line to several former HTL employees. From 1980 through October 1994, the company remained in Monrovia. In November 1994, the company was moved to Minden, NV and continues operations in that location.

## LAND, AIR, SEA, SPACE

Direct Drive Design sets the industry standard for durability and has been recognized by the US Military as the preferred design in high vibration, high shock applications.

For this reason, Perma-Cal® gauges see wide usage in Aerospace, Military, Marine, Oil & Gas, Petrochemical, Industrial and Commercial Diving applications.

## USA PARTS, USA MADE, USA OWNED

Since its founding, Perma-Cal® has committed, as a USA based small business, to support other American small businesses. As such, Perma-Cal® continues to source USA made parts. Manufacturing processes not completed in-house are outsourced to approved local vendors.

## LIFETIME LIMITED WARRANTY

### ONE MOVING PART

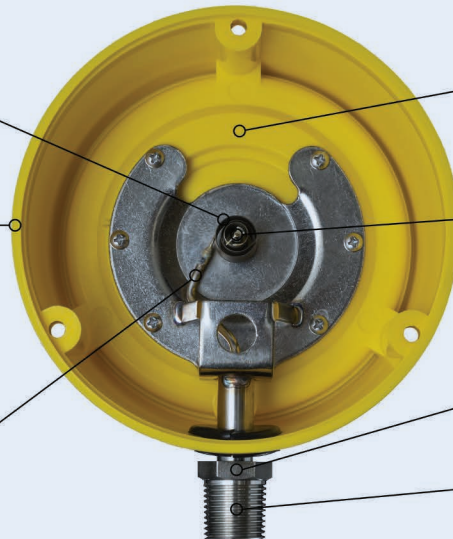
HELICALLY-WOUND BOURDON TUBE

### DIVERSE CASE MATERIAL OPTIONS

High-Temp, Chemical & Impact Resistant

### QUALITY WETTED PARTS CONSTRUCTION

Inconel X-750, 300-series SS, Silver Braze (*nickel available*)



### SOLID FRONT CASE

Designed for safety

### INTERNAL POINTER DAMPENING

No need for liquid fill

### MINI-SEAL COMPATIBILITY

Low volume displacement

### HIGH QUALITY CONNECTION MATERIAL

316 SS Standard (*Monel available*)

# DIRECT DRIVE TECHNOLOGY

## WHAT'S THE DIFFERENCE?



### PERMA-CAL® DIRECT DRIVE DESIGN:

#### One moving part

- No gears, no linkages, no springs
- Helical Bourdon Tube attached directly to the pointer shaft

#### No liquid fill

- Internally dampened to reduce pointer flutter
- No internal mechanical components requiring lubrication

#### Greater life equals lower costs

- Fatigue life oftentimes of 1,000,000 cycles or more
- Reduces maintenance costs and allows for extended recertification cycles

#### Safety is prioritized

- All gauges feature a Solid Front Case for greater protection
- Low volume minimizes spillage if catastrophic failure occurs

#### Proof Pressure above industry standard

Withstands over-pressure of 150% F.S.

#### Reliable temperature performance

- Inconel, Helical Bourdon Tube means that accuracy is less affected by changes in temperature

#### Consistent, accurate diaphragm seal performance

- Unique, low volume design requires less fill fluid reducing the effect of temperature on accuracy
- Mini-Seal compatibility provides performance advantages and significant cost savings

**Demanded by the US Military for high vibration and shock applications**

### VS. C-TUBE DESIGN:

#### Multiple moving parts

- Over time, movement-amplifying gears, linkages and springs can wear or break
- Requires lubrication for proper functionality

#### Liquid filled

- Liquid filled to reduce pointer flutter and provide internal lubrication
- Fill can leak or cause discoloration resulting in premature failure

#### Shorter fatigue life

- Fatigue life often only 20,000-30,000 cycles
- Internal wear results in increased maintenance and shorter recertification cycles

#### Safety is optional

- Optional solid front case increases risk of a front blowout
- High volume spills large amounts of process if catastrophic failure occurs

#### Standard Proof Pressure

- Withstands over-pressure of 125% F.S.

#### Uncertain temperature performance

- Stainless Steel, C-Type Bourdon Tubes provide less consistent readings vs. Inconel

#### Inconsistent diaphragm seal performance

- High Volume C-Tube combined with a larger seal requires significantly more fill fluid
- Increasing temperature leads to fill fluid expansion and inconsistent accuracy

**Accepted by the US Military for standard applications**

# TRUSTED ON CRITIC

PERMA-CAL® GAUGES OFFER SUPERIOR PERFORM

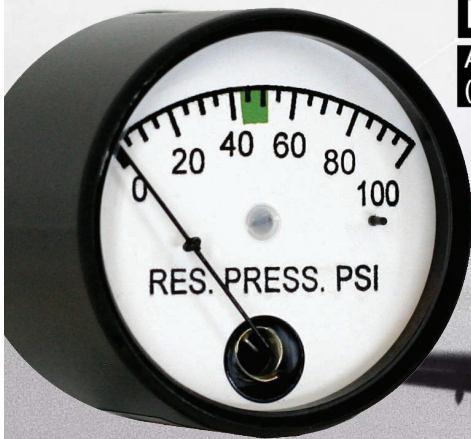
## LAND



**Part Number: 90-453-9357**

Application: Battle Tank (specifics unknown)

## AIR



**Part Number: 90-900-1052**

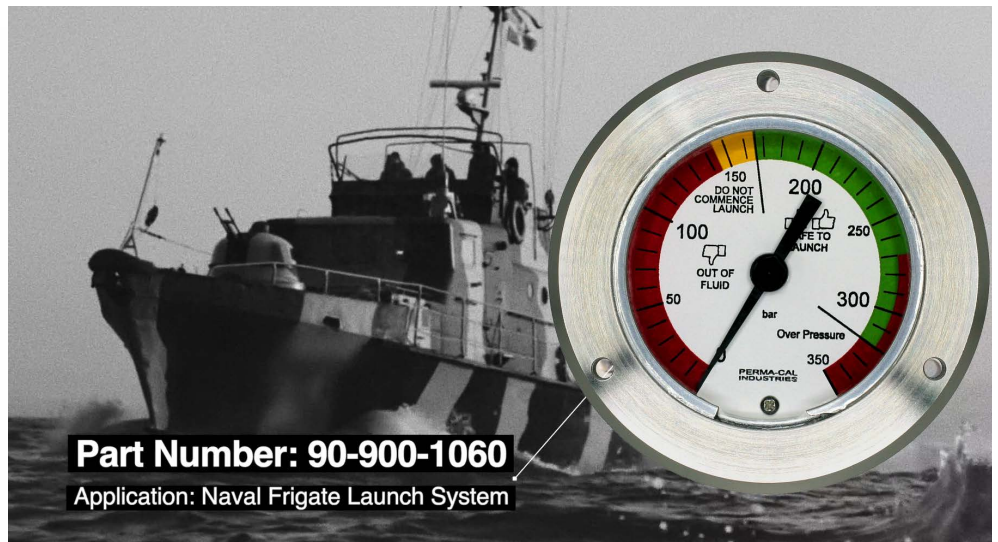
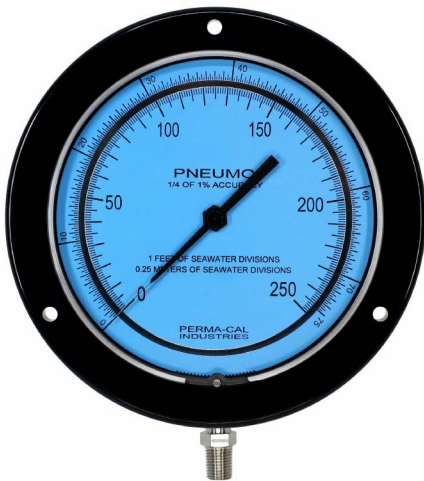
Application: Reservoir Pressure  
(located in Commercial Aircraft Wheelwell)



# PERMA-CAL APPLICATIONS

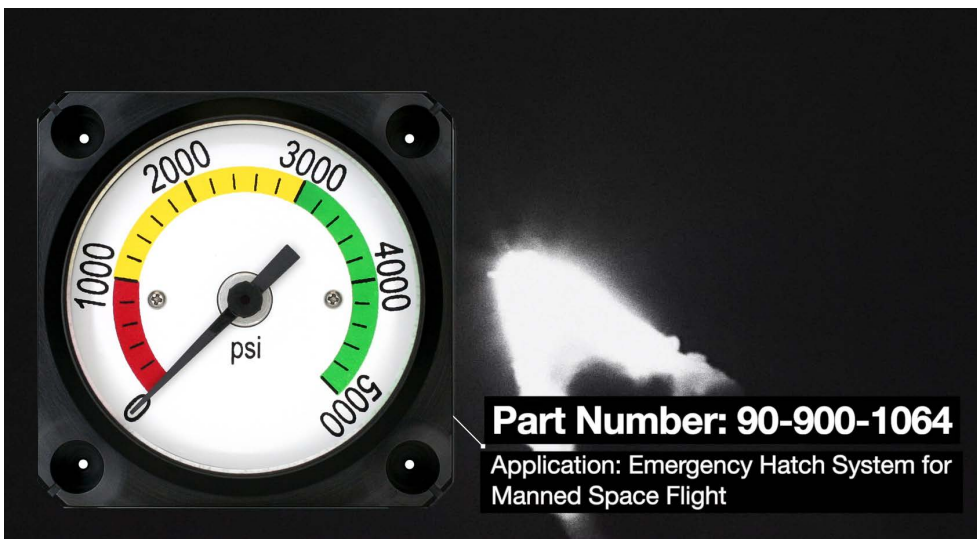
PERFORMANCE IN THE MOST DEMANDING ENVIRONMENTS

## SEA



**Part Number: 90-900-1060**  
Application: Naval Frigate Launch System

## SPACE



**Part Number: 90-900-1064**  
Application: Emergency Hatch System for Manned Space Flight





# PROCESS GAUGES

## GEARLESS, DIRECT DRIVE PRESSURE GAUGES

Designed to perform on any application

### ADVANTAGES

#### ONE MOVING PART

Unmatched vibration, pulsation and shock performance. No linkages, springs, gears, or liquid fill to wear, break or leak.

#### OOPS! PROOF

Proof pressure (over-pressure) of 150% F.S. exceeds industry standards. Survives the day to day beatings of an unpredictable industrial environment.

#### TEMPERATURE HERO

Trusted in extremes from -65°F up to 600°F media. Accuracy is 25% less affected by temp fluctuations. Inconel Element = Low Coefficient of Thermal Expansion

#### AEROSPACE QUALITY | MILITARY TRUSTED

Direct Drive is demanded on critical applications. The same military grade Direct Drive technology used in our Aerospace and Military designs is used in our industrial gauges for commercial applications.

#### MINI-SEAL COMPATIBILITY

Requires 85% less fill fluid than the competition. Accuracy is 50% less affected by temps above 68°F. Low volume design enables performance on mini-diaphragm seals providing performance advantages and cost savings.

**Lifetime Limited Warranty**



**ACCURACY** (Ref. @ 68°F, ±2°F)  
±0.5% F.S. at M.S. / ±1.0% F.S.  
±0.5% F.S. (Grade 2A)

**RANGE AVAILABILITY**  
Vacuum – 15,000 psi (or equivalent)  
Single Scale, Dual Scale, Vacuum and Compound  
psi, bar, kPa, MPa, kg/cm<sup>2</sup>, inHg, mmHg

**DIAL**  
Stainless Steel, Powder Coated Finish  
Standard: White with Black Markings  
Ray Series: Neon Yellow, Black Markings, Red Pointer

**WINDOW**  
Acrylic  
Tempered Glass

**POINTER**  
Anodized Aluminum  
Zero-adjustable

**CONNECTION**  
316 SS or Monel  
¼ or ½ NPT (other options available)  
Welded Mini-Seal (316 SS or Hastelloy C-276)

**WETTED PARTS**  
Inconel X-750  
300-series SS  
Silver Braze (nickel available)

**BURST PRESSURE**  
500% F.S. pressure or 25,000 psi

**PROOF PRESSURE**  
150% F.S. for gauges ≤ 5,000 psi  
125% F.S. for gauges ≥ 5,000 psi

CUSTOMIZATION AVAILABLE. CONTACT THE FACTORY.

## CASE CONFIGURATIONS

### ABS PLASTIC

#### COLORS

Black, Blue, Green, Red, White, Yellow (availability varies by size)

#### OPERATING TEMPERATURE

Process: -65°F to 250°F

Ambient: -65°F to 190°F



2.5", 4.5", 6", 8.5"  
Front Flange



2.5", 4.5", 6"  
No Flange



2.5", 4.5", 6"  
Rear Flange



3.5", 4.5"  
Turret

### METAL

### MILITARY GRADE

### HIGH TEMP

High performance cases providing extreme temperature, chemical and shock resistance.



2.5" No Flange  
Aluminum



4.5" No Flange  
SS Case, Alum. Ring



4.5" No Flange  
Stainless Steel



3.5", 4.5", 8.5"  
Rear Flange  
Aluminum/Skydrol



4.5" Turret  
Glass-Filled Nylon

#### COLORS

SS and Aluminum: Powder Coated Finish (specify color)

Skydrol: Purple Anodized Ring, Unpainted Case

Glass-Filled Nylon: Available in yellow only

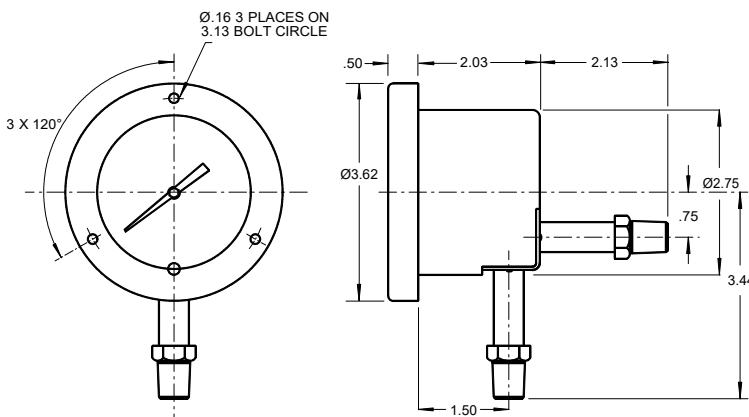
#### OPERATING TEMPERATURE

Process: -65°F to 600°F

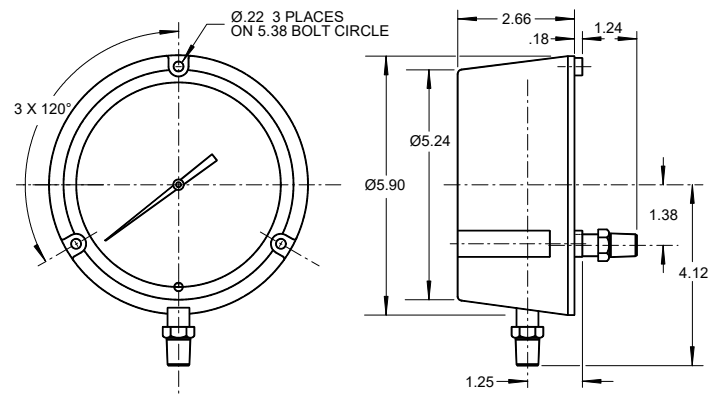
Ambient: -65°F to 400°F

CALIBRATION CERTIFICATE AVAILABLE.

## DIMENSIONAL SPECS (common sizes)



2.5" Front Flange



4.5" Turret



# PRECISION TEST GAUGES

## GEARLESS, DIRECT DRIVE PRESSURE GAUGES

Reliable accuracy on critical applications

### ADVANTAGES

#### ONE MOVING PART

Unmatched vibration, pulsation and shock performance. No linkages, springs, gears, or liquid fill to wear, break or leak.

#### TRAVEL READY

Survives the day to day beatings of an industrial environment or a bumpy ride in the back of a pickup.

#### TRUSTED ACCURACY

Accuracy is **25%** less affected by temp fluctuations. Trusted in extremes from **-65°F** up to **600°F** media. Inconel Element = Low Coefficient of Thermal Expansion

#### AEROSPACE QUALITY | MILITARY TRUSTED

**Direct Drive** is demanded on critical applications. The same military grade Direct Drive technology used in our Aerospace and Military designs is used in our industrial gauges for commercial applications.

**Lifetime Limited Warranty**



#### ACCURACY (Ref. @ 68°F, ±2°F)

±0.25% F.S. (Grade 3A)

Calibration Certificate Included

Accuracy exceptions. Contact factory for details.

#### RANGE AVAILABILITY

Vacuum – 15,000 psi (or equivalent)

Single Scale, Dual Scale, Vacuum and Compound psi, bar, kPa, MPa, kg/cm<sup>2</sup>, inHg, mmHg

#### DIAL

Stainless Steel, Powder Coated Finish

White with Black Markings

#### WINDOW

Acrylic

Tempered Glass

#### POINTER

Anodized Aluminum

Zero-adjustable

#### CONNECTION

316 SS or Monel

¼ or ½ NPT (other options available)

#### WETTED PARTS

Inconel X-750

300-series SS

Silver Braze (nickel available)

#### BURST PRESSURE

500% F.S. pressure or 25,000 psi

#### PROOF PRESSURE

150% F.S. for gauges ≤ 5,000 psi

125% F.S. for gauges ≥ 5,000 psi

CUSTOMIZATION AVAILABLE. CONTACT THE FACTORY.



## CASE CONFIGURATIONS

### ABS PLASTIC

#### COLORS

Black, Blue, Green, Red, White, Yellow (availability varies by size)

#### OPERATING TEMPERATURE

Process: -65°F to 250°F  
Ambient: -65°F to 190°F



2.5", 4.5", 6", 8.5"  
Front Flange



2.5", 4.5", 6"  
No Flange



2.5", 4.5", 6"  
Rear Flange



4.5"  
Turret

### METAL

### MILITARY GRADE

### HIGH TEMP

High performance cases providing extreme temperature, chemical and shock resistance.



2.5" No Flange  
Aluminum



4.5" No Flange  
SS Case, Alum. Ring



4.5" No Flange  
Stainless Steel



4.5", 8.5"  
Rear Flange  
Aluminum/Skydrol



4.5" Turret  
Glass-Filled Nylon

#### COLORS

SS and Aluminum: Powder Coated Finish (specify color)

Skydrol: Purple Anodized Ring, Unpainted Case

Glass-Filled Nylon: Available in yellow only

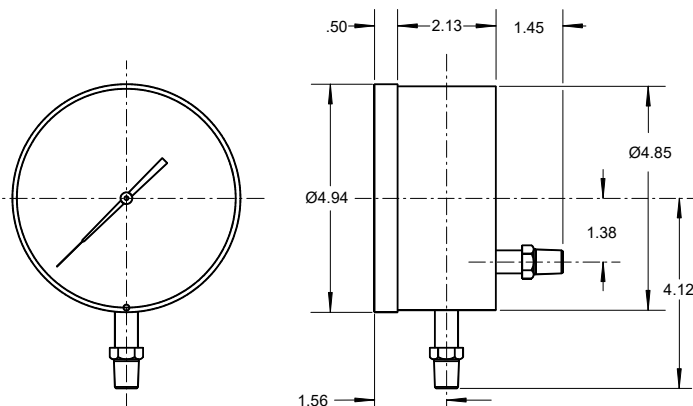
#### OPERATING TEMPERATURE

Process: -65°F to 600°F

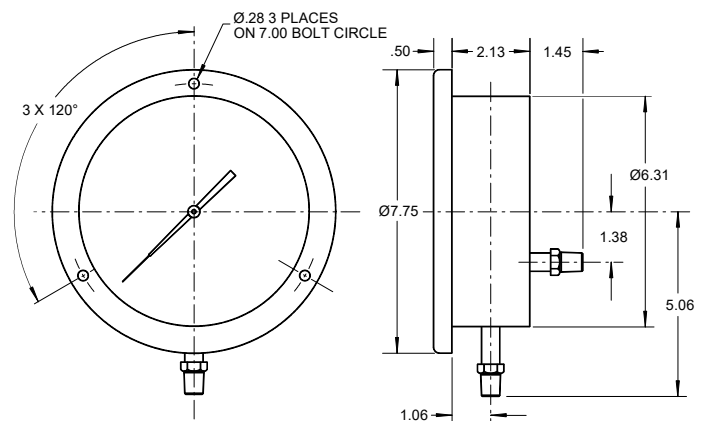
Ambient: -65°F to 400°F

CLEANED FOR OXYGEN SERVICE AVAILABLE.

## DIMENSIONAL SPECS (common sizes)



4.5" No Flange



6" Front Flange



# WELDED DIAPHRAGM SEALS

Offering the Premier Pressure Gauge / Mini-Seal Combination

## ADVANTAGES

### PROVEN PERFORMANCE

**Gearless, Direct Drive Design** sets the industry standard for vibration, pulsation and shock. Performance without gauge fill fluid means sanitary environment friendly.

### RELIABLE ACCURACY

Accuracy is **50%** less affected by temp fluctuations. Requires **85%** less fill fluid vs. the competition. Compact, low-volume design significantly reduces the impact of temperature on gauge accuracy.

### ELIMINATE LEAK PATHS

**Sleek, all-welded design** customized to perform specifically on Perma-Cal® gauges and eliminate potential leak paths.

### PRICE ADVANTAGE

**Superior performance at a superior price.** Perma-Cal® Gauge on Mini-Seal versus C-Tube Gauge on Mini or Standard Seal

The choice is clear.



### ACCURACY (Ref. @ 68°F, ±2°F)

±.5% F.S. at M.S. / ±1% F.S.  
±.5% F.S. (Grade 2A)

### RANGE AVAILABILITY

Vacuum to 1,000 psi (or equivalent)  
Single Scale, Dual Scale, Vacuum and Compound  
psi, bar, kPa, kg/cm<sup>2</sup> (others available)  
*Gauges below 100 psi may see loss of accuracy at low pressures.*

### DIAL

Stainless Steel, Powder Coated Finish  
Standard: White with Black Markings  
Ray Series: Neon Yellow, Black Markings, Red Pointer  
*Customization available. Contact the factory.*

### WINDOW

Acrylic  
Tempered Glass

### POINTER

Anodized Aluminum  
Zero-adjustable

### DIAPHRAGM SEAL

**Material (Wetted Parts):** 316 SS or Hastelloy  
**Connection Type:** ½ NPT or ¼ NPT, Male or Female  
**Burst Pressure:** 10,000 psi

### FILL FLUID

**Standard Fill:** Silicone DC200 (or equivalent)  
Operating Temp: -40°F to 400°F  
**Inert Fill:** Halocarbon 6.3 (similar to Fluorolube but suitable for vacuum service)  
Operating Temp: -40°F to 400°F  
**High-Temp Fill:** Silicone DC704 (or equivalent)  
Operating Temp: 0°F to 650°F  
*Max 200°F in vacuum service for all fills.*

CONSULT THE FACTORY FOR OTHER OPTIONS.

## CASE CONFIGURATIONS

### ABS PLASTIC

#### COLORS

Black, Blue, Green, Red, White, Yellow (availability varies by size)

#### OPERATING TEMPERATURE\*

Process: -40°F to 650°F

Ambient: -40°F to 190°F



2.5", 4.5" No Flange



4.5" Rear Flange



3.5", 4.5" Turret

### METAL

### MILITARY GRADE

### HIGH TEMP

High performance cases providing extreme temperature, chemical and shock resistance.



2.5" No Flange  
Aluminum



4.5" No Flange  
SS Case, Alum. Ring



4.5" No Flange  
Stainless Steel



3.5", 4.5"  
Rear Flange  
Aluminum



4.5" Turret  
Glass-Filled Nylon

#### COLORS

SS and Aluminum: Powder Coated Finish (specify color)

Glass-Filled Nylon: Available in yellow only

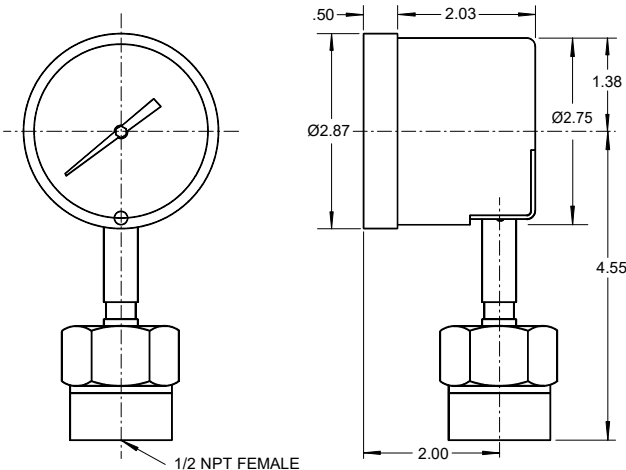
#### OPERATING TEMPERATURE\*

Process: -40°F to 650°F

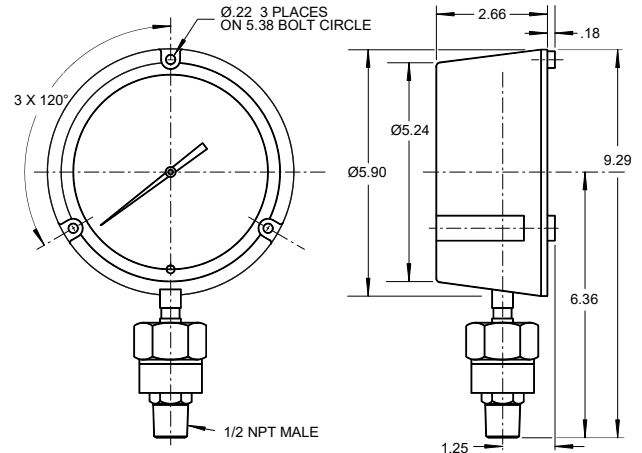
Ambient: -40°F to 400°F

\*Case, Diaphragm Seal, and Fill Fluid selection determines operating temperature range.

## DIMENSIONAL SPECS (common sizes)



2.5" No Flange with Female Mini-Seal



4.5" Turret with Male Mini-Seal



# CAISSON & PNEUMO DEPTH GAUGES

## GEARLESS, DIRECT DRIVE PRESSURE GAUGES

Trusted where safety, reliability and accuracy are paramount

### ADVANTAGES

#### ONE MOVING PART

Unmatched vibration, pulsation and shock performance. No linkages, springs, gears, or liquid fill to wear, break or leak.

#### READY FOR ROUGH SEAS

Survives the day to day transport and use of a commercial diving case, and the unpredictability of corrosive marine environments.

#### TRUSTED ACCURACY

Accuracy is **25%** less affected by temp fluctuations. Trusted in extremes from **-65°F up to 190°F** ambient. Inconel Element = Low Coefficient of Thermal Expansion

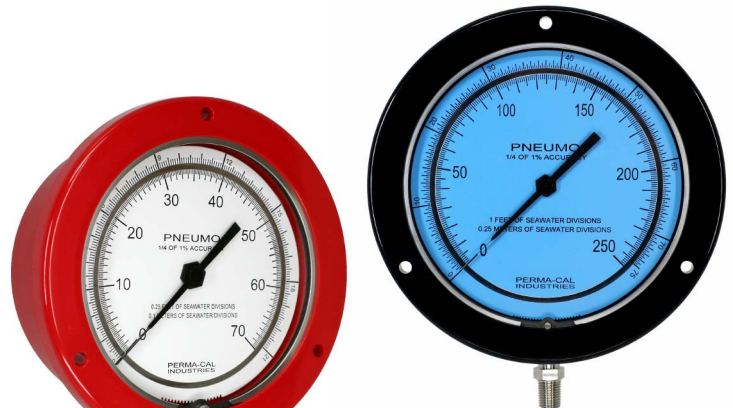
#### US NAVY APPROVED

Direct Drive is demanded on critical applications. Trusted in the most extreme marine environments, our gauges are widely used by the US Navy.

#### COLOR CODING MADE EASY

6 distinct colors makes it easy to color code.

**Lifetime Limited Warranty**



**Pneumo Depth Gauges**  
*Ideal for Sea Water Depth measurement*



**Caisson Gauges**  
*For use in Hyperbaric Chambers*

#### ACCURACY (Ref. @ 68°F, ±2°F)

±0.25% F.S. (Grade 3A) Calibration Certificate Included  
*Accuracy exceptions. Contact factory for details.*

#### RANGE AVAILABILITY

70 - 3,500 FSW (or equivalent)  
Single Scale: FSW  
Dual Scale: MSW | FSW, FSW | psi  
*Caisson available in 100 psi and above.*

#### DIAL

Stainless Steel, Powder Coated Finish  
White with Black Markings

#### WINDOW

Acrylic  
Tempered Glass

#### POINTER

Anodized Aluminum  
Zero-adjustable

#### CONNECTION

316 Stainless Steel  
¼ or ½ NPT (other options available)

#### WETTED PARTS

Inconel X-750  
300-series SS  
Silver Braze

#### BURST PRESSURE

500% F.S. pressure or 25,000 psi

#### PROOF PRESSURE

150% F.S. pressure

#### CLEANED FOR OXYGEN SERVICE AVAILABLE.

**CUSTOMIZATION AVAILABLE. CONTACT THE FACTORY.**

## CASE CONFIGURATIONS

### ABS PLASTIC *(most common)*

#### OPERATING TEMPERATURE

Process: -65°F to 250°F  
Ambient: -65°F to 190°F

#### COLORS

Black, Blue, Green,  
Red, White, Yellow

Contact the Factory  
for other case sizes  
and materials.



4.5", 6", 8.5" Front Flange



4.5", 6" No Flange

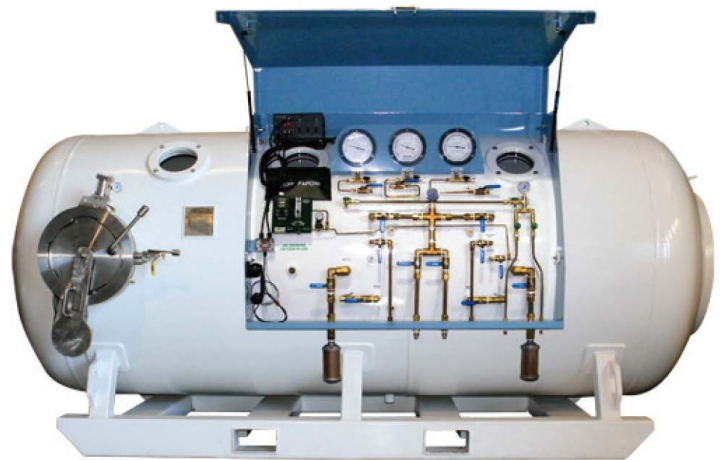


4.5", 6" Rear Flange

## COMMON APPLICATIONS

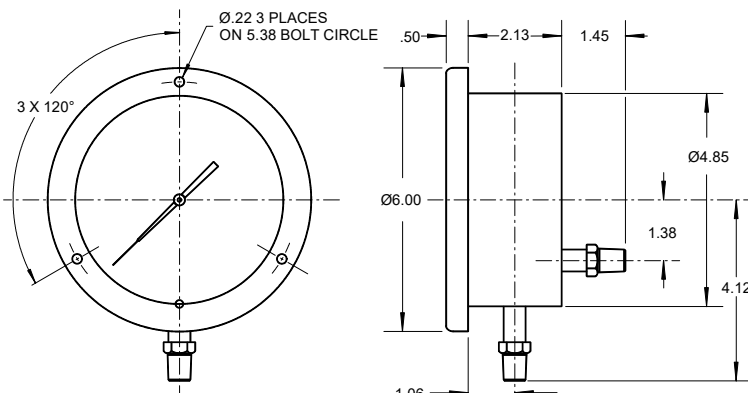


Dive Cases &  
Air Control Systems

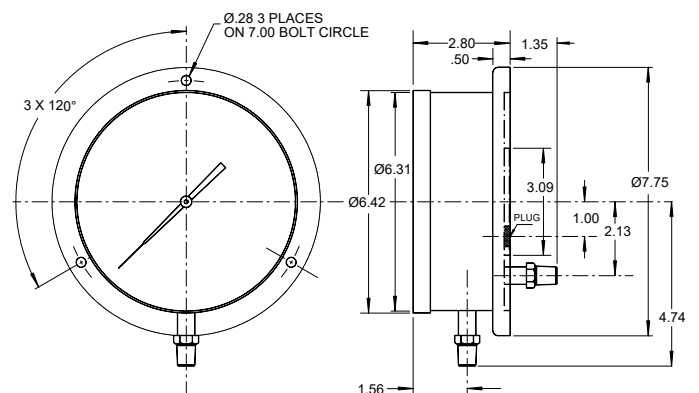


Hyperbaric & Decompression Chambers

## DIMENSIONAL SPECS *(common sizes)*



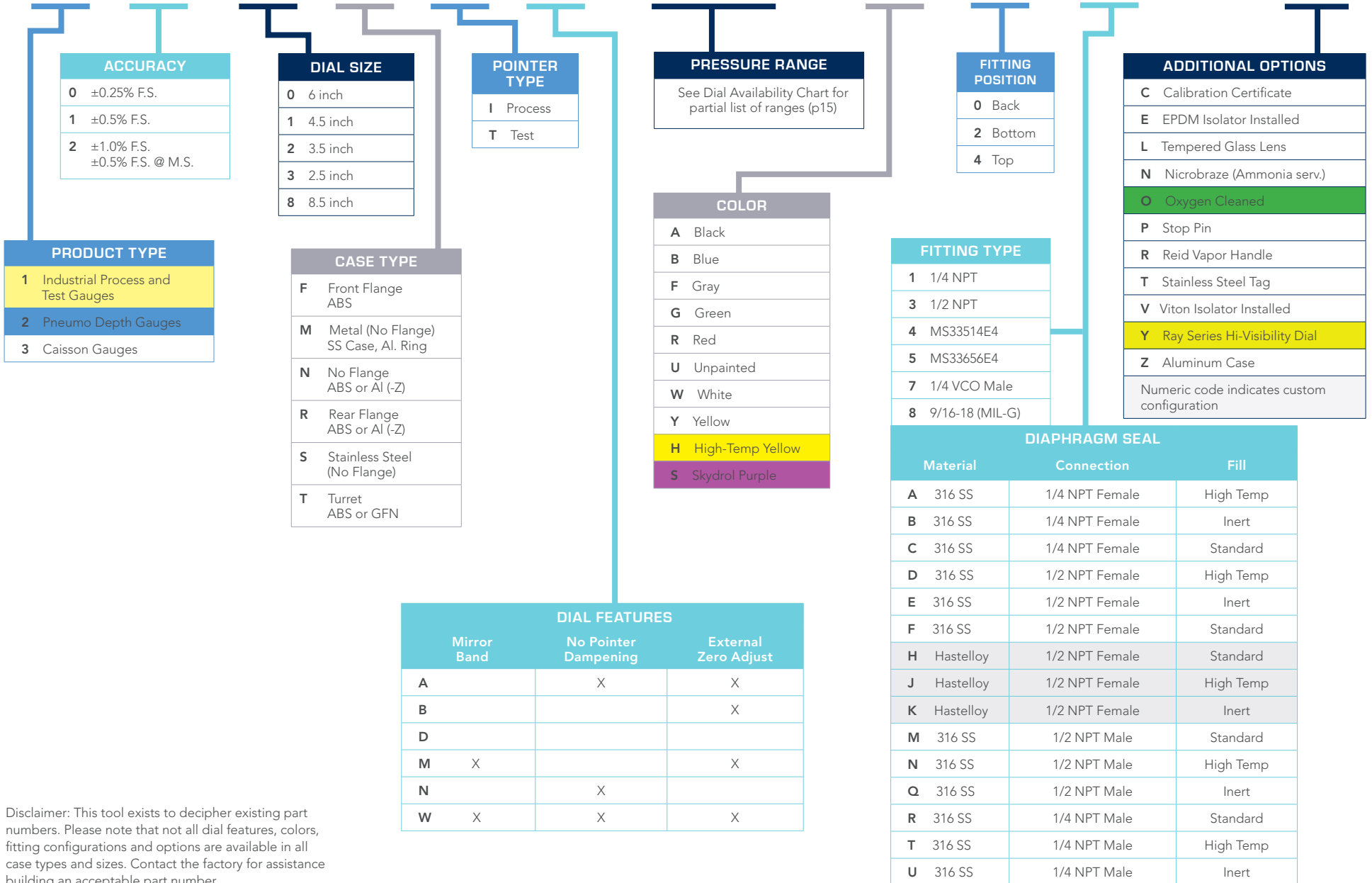
4.5" Front Flange



6" Rear Flange Caisson

# PART NUMBER DESIGNATIONS

1 2 1 T I B 0 7 Y 2 3 - C



Disclaimer: This tool exists to decipher existing part numbers. Please note that not all dial features, colors, fitting configurations and options are available in all case types and sizes. Contact the factory for assistance building an acceptable part number.

# RANGE AVAILABILITY

Below is a partial list of available ranges. Contact your supplier for a complete list.

## POSITIVE PRESSURE RANGES

Range Code	psi
00 (135°)	15
01	30
02 (135°)	30
03	60
04	100
05	150
23	160
06	200
07	300
08	400
20	500
09	600
10	800
11	1,000
12	1,500
13	2,000
14	3,000
22	4,000
15	5,000
16	6,000
21	8,000
17	10,000
18	15,000

## VACUUM & COMPOUND RANGES

Range Code	inHg / psi
25	30 / 0
26	30 / 15
27	30 / 30
24	30 / 60
29	30 / 100
28	30 / 150
35	30 / 160
30	30 / 200
31	30 / 300
32	30 / 400
33	30 / 500
34	30 / 600

## SEA WATER RANGES

Range Code	MSW   FSW
87	21   70
86	45   150
92	70   230
88	75   250
89	90   300
90	100   350
91	140   450
93	225   750
94	300   1000
96	350   1200
95	450   1500
97	1000   3500

## OVER 300 RANGES AVAILABLE

psi, bar, kPa, MPa, kg/cm<sup>2</sup>, inHg, mmHg, FSW, MSW, Receiver and Refrigerants

Single Scale, Dual Scale, Vacuum & Compound

CUSTOMIZATION AVAILABLE (RANGE, UNITS, LOGO, ETC.) CONTACT THE FACTORY.



### CUSTOMER SERVICE

E. [CUSTOMERSERVICE@PERMA-CAL.COM](mailto:CUSTOMERSERVICE@PERMA-CAL.COM)  
P. 775-782-1026 F. 775-782-1056

### SALES

E. [SALES@PERMA-CAL.COM](mailto:SALES@PERMA-CAL.COM)  
P. 800-991-1357 F. 775-782-1056

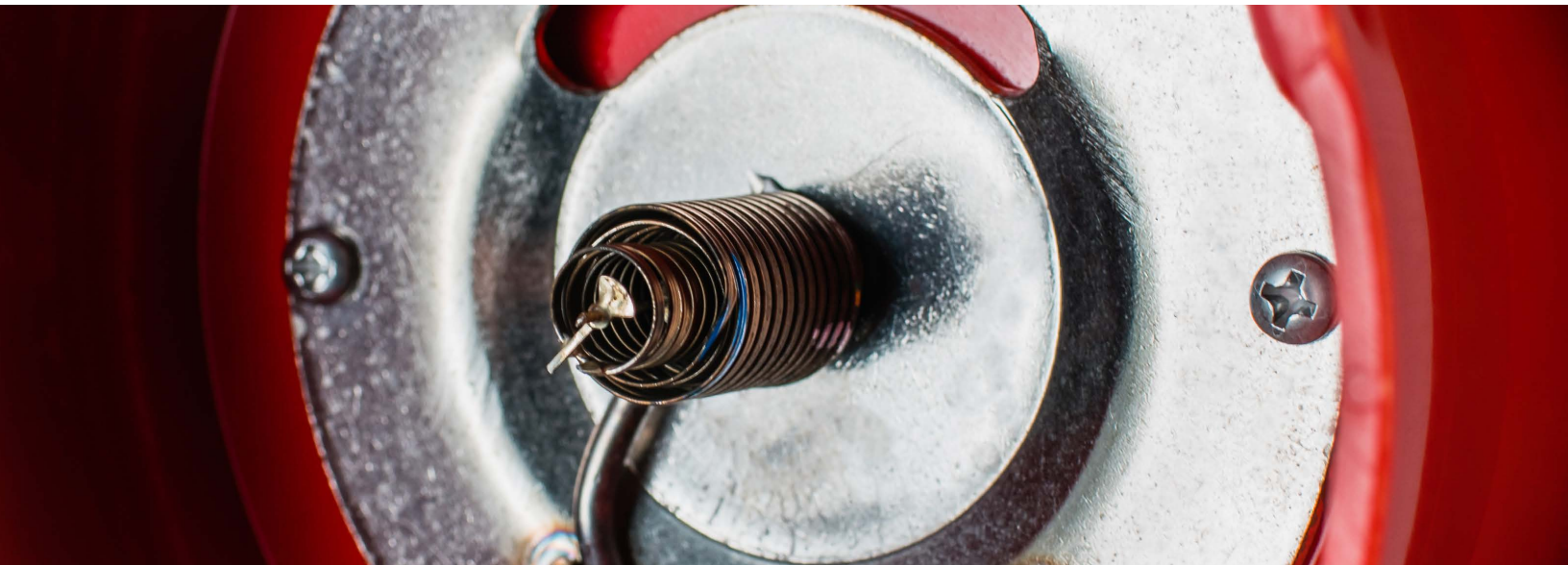
[WWW.PERMA-CAL.COM](http://WWW.PERMA-CAL.COM)

### CERTIFICATIONS

The Quality Management System of Perma-Cal® complies with the International and Aerospace standards.



**AS9100D**  
**ISO9001:2015**



SCAN TO WATCH  
OUR EXTREME DEMOS



**PERMA-CAL® INDUSTRIES, INC.**  
DIRECT DRIVE PRESSURE GAUGES