Give Us Your Worst

3D INSTRUMENTS™

When does a firefighter realize the value of an engineer?

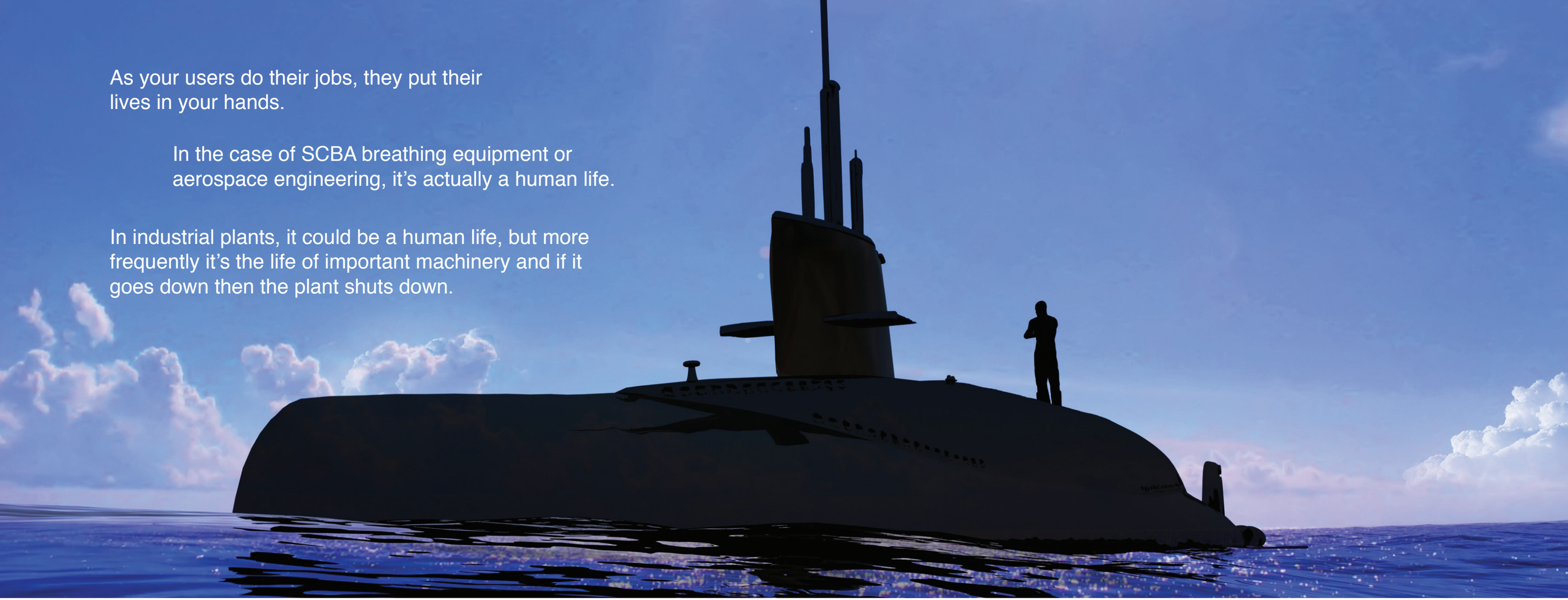
In the middle of a 1,400°F inferno

When does an airplane pilot realize the value of an engineer?

10,000 feet in the air

When does a maintenance technician realize the value of an engineer?

During downtime



As your users do their jobs, they put their lives in your hands.

In the case of SCBA breathing equipment or aerospace engineering, it's actually a human life.

In industrial plants, it could be a human life, but more frequently it's the life of important machinery and if it goes down then the plant shuts down.

When Lives Are On The Line...

If you have to develop SCBA equipment that will allow a firefighter to take a breath in a raging inferno...or craft a landing gear system on a passenger jet…or maintain a pump application with severe vibration...then you know what it's like to develop equipment for the nastiest and most dangerous possible scenarios.

We at 3D Instruments, LP know how important it is that your designs and equipment succeed despite being in the most extreme pressure situations. We have provided early warning signs for the worst pressure applications since 1970. That's when we developed a groundbreaking Bourdon tube technology called "direct drive" for the demanding needs of the aerospace industry. Today, we provide rugged and reliable pressure measurement solutions that withstand extreme environments for a variety of industries ranging from SCBA to Aerospace to Industrial.

You Want Someone Who Understands How To Deal With Pressure

Our a direct drive pressure gauge has only one working part—a helically-wound Bourdon tube made of Inconel® X-750 or Copper Beryllium. With no additional mechanical components vulnerable to wear, a direct drive pressure gauge can last longer than other gauges, thus reducing down time and total cost of ownership.

The military has used direct drive pressure gauges on aircrafts, tanks, and submarines since the 1960s for one simple reason: they are extremely resistant to shock, vibration, and pulsation. During military testing, direct drive gauges placed within the hulls of battleships have survived direct missile strikes. Over time, our customers have used our direct drive gauges in numerous mission-critical applications such as jet fighter struts, tank gun turrets and submarine ballast tanks. Now, we bring this same performance to your mission-critical applications.

Inconel is a registered trademark of Inco Alloys International Inc.

What Direct Drive Technology Means For You

Over Pressure Protection
Because of a single sensing element, direct drive gauges retain accuracy even at 150% over-pressure. The elastic helical Bourdon tube absorbs the over pressure and automatically returns to its original setting.

Burst Protection
Direct drive technology prevents early failure by incorporating a standard burst pressure of up to five times full scale.

Wear Protection
Direct drive gauges work with a single moving part to maximize lifespan and accuracy. There are no springs, gears, sectors or linkages that wear out, requiring you to recalibrate or cause loss of accuracy.

Design Flexibility
We can wind helical Bourdon tubes for a multitude of pressure ranges from full vacuum (30” Hg) to extremely high-pressure (20,000 psi).

Reduced Cost
Direct drive gauges do not need to be replaced nearly as often as standard duty gauges and require less recalibration than standard gauges, reducing purchasing and maintenance expenses and overall total cost of ownership.

Six-Year Warranty
We offer guarantees up to six-years (depending on products) to bring you peace of mind. If one of our gauges fails in an application for which it has been recommended, then we will repair or replace it without charge.

3D Instruments conducts a variety of tests on gauge characteristics such as overpressure protection, burst protection, wear protection, and calibration.

Going the Extra Mile with Every Element

Every element in a 3D Instruments gauge has been optimized, from the Inconel tube and case materials to the manufacturing process and testing. Some of the factor s that make our gauges better than the competition include:

Sapphire bearings on the pointer shaft reduce friction, helping to provide long-lasting accuracy and performance.

We can customize all our product lines to meet your needs. For instance, our case and body features are made of numerous materials, ranging from aluminum over Monel to fire-resistant Cyolac® ABS.

A single sensing element eliminates the wear and tear, and shock sensitivity, of components found in other gauges. We can make this element out of Inconel® X-750 or other materials.

Construction of pressure connections and materials can be modified according to your needs and designs. All of our industrial applications use 300 Series Stainless Steel (or better) on the wetted parts.

Cycolac is a registered trademark of Sabic IP

Because our gauges have no movements inside, we can make them lighter and smaller than standard gauges.

Breathe Anywhere

Breathe anywhere. That's the goal, right? To allow first responders to run into the worst possible scenarios—when everyone else is running away—and be able to breathe while doing a life-threatening job. Firefighters may only have 15 minutes of air with their personal protection equipment, and they need every second to do their jobs. HAZMAT technicians need enough air to make it to a decontamination station and get out of the suit before oxygen drops to dangerous levels.

As you develop SCBA solutions based on these dynamics, you want to keep the responders as safe as possible. That's why we make our gauges durable enough to handle the wear and tear of firefighter and HAZMAT professional use. We custom wind a Bourdon tube so that the tube retains its span and accuracy for the life of the product.

Custom Designed For Your Smaller, Lighter Equipment

We can design and customize tubes to your exact requirements.

We can custom design gauges with more visibility, such as a glow-in-the dark faceplate or a double pointer bolle gauge so a user can get a reading from any angle. You even have the option of private labeling and creating a custom dial design. We offer a complete system, ranging from gauges and hoses to capillary lines for any SCBA application.

Every first responder deserves a round trip. As you design SCBA equipment that keeps them breathing in the midst of a raging inferno or a chemical spill, we can help you deliver equipment that is properly designed for the anticipated conditions. When lives are on the line... look to 3D Instruments.

AEROSPACE

Without gears and a linkage, our direct drive gauges are as compact and lightweight as your specs require.

Matching Your Need For Lightweight

Because aircraft are weight conscious, our aerospace OEM customers often specify a maximum weight for a pressure gauge. Because our direct drive gauges require no movement, we can make them as compact and lightweight as needed to fit in an airplane. You can order our gauges with a diameter as small as 1⁄2” while still maintaining the full application advantages of our direct drive design.

Regardless of whether you are designing an airborne breathing system, or a hydraulics or pneumatic system, we understand that you need a quick turnaround from us. We will work with you to ensure we pass your testing and acceptance criteria in as little time as possible.

INDUSTRIAL

You need rugged and reliable pressure measurement solutions that withstand pulsation, shock, and vibration. Our direct drive gauge has only one moving part, which means it does not have complex gears and linkages that are prone to wear.

The Value Of Maintenance

In capital intensive industries, maintenance costs can represent up 30-40% of total operating costs.* Proactive maintenance approaches can add increased throughput, lower working capital requirements, increased labor productivity, improved safety, and lower costs—all measurable on the income statement, balance sheet, and cash flow statements.

To garner these benefits, you can use gauges as an alarm to:

- Detect signs of degradation in process performance
- Diagnose causes of system and production disruptions
- Predict how long a piece of equipment can be safely and economically run
- Identify potential time bombs that could cause catastrophic failures

When the life of your critical equipment is on the line, you want to know you're doing your best to check its vital signs and maintain the health of your assets. As doctors use instruments to gauge the health of a human being, you use instruments to gauge the health of your machinery.

** http://filebox.vt.edu/users/hazhir/www/papers/ZuashkianiEtal-AssetManagement.pdf*

Total Ownership Cost

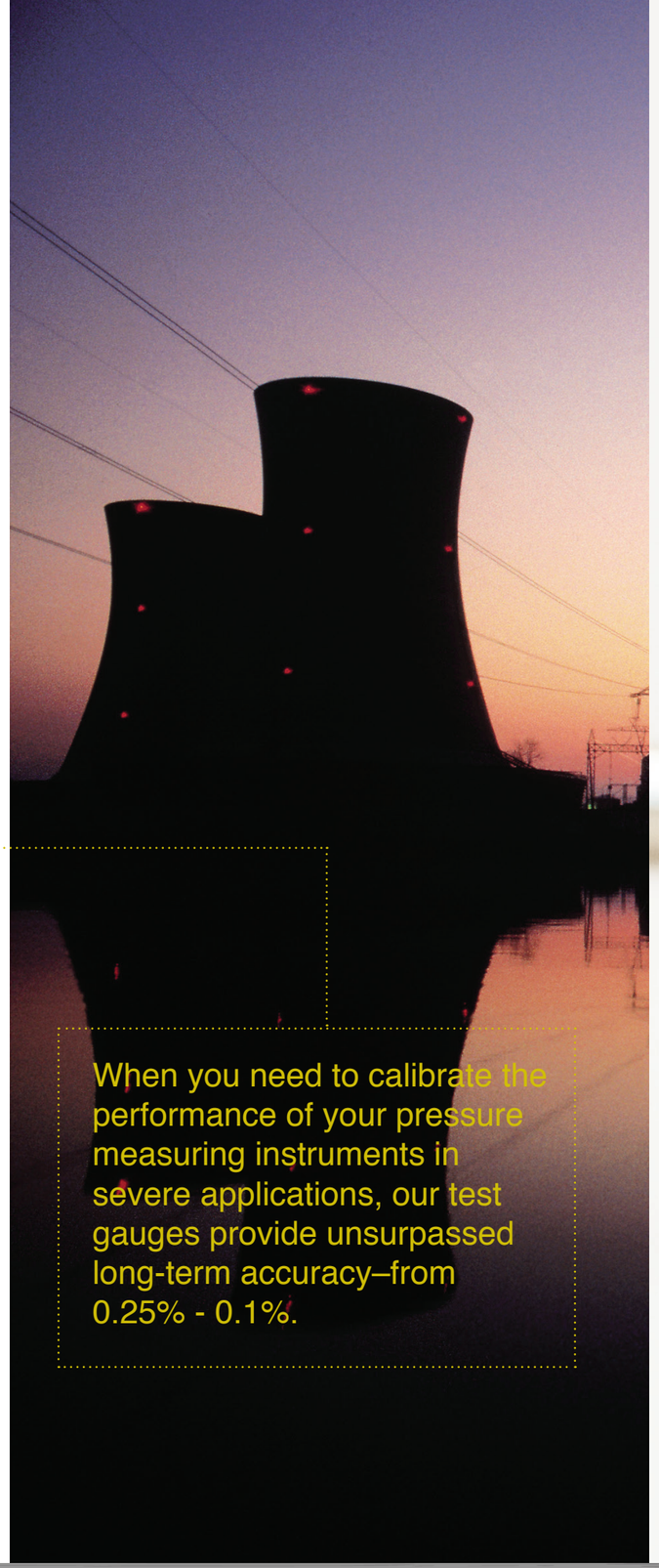
Fewer moving parts means less component wear from extreme environments. This durability translates into cost savings as seen in the chart below.

	Traditional C-Shape Bourdon Tube Gauge	Direct Drive Gauge
Gauge Price	$100	$200
MRO Parts Ordered Per Year (qty)	100	25
Total Gauge Cost/Year	**$10,000**	**$5,000**

Guaranteed Precision

You can use our test gauges in a variety of settings, including extreme temperatures. Our high-precision test gauges have a Bourdon tube made of Ni-Span C, which has outstanding controllable thermoelastic coefficient characteristics and excellent strength and oxidation resistance in high temperature atmospheres. The alloy is processed to have a constant modulus of elasticity at temperatures from -25°F (-32°C) to +125°F (+52°C). Our other standard test gauges use the extremely reliable direct drive coil made out of Inconel® X-750.

You can use our test gauges in extreme applications involving dust, vibration and temperature variation because the bronze bushings in our gauges ensure low friction and long-term precision. We also use corrosion-resistant materials to handle a variety of process media.



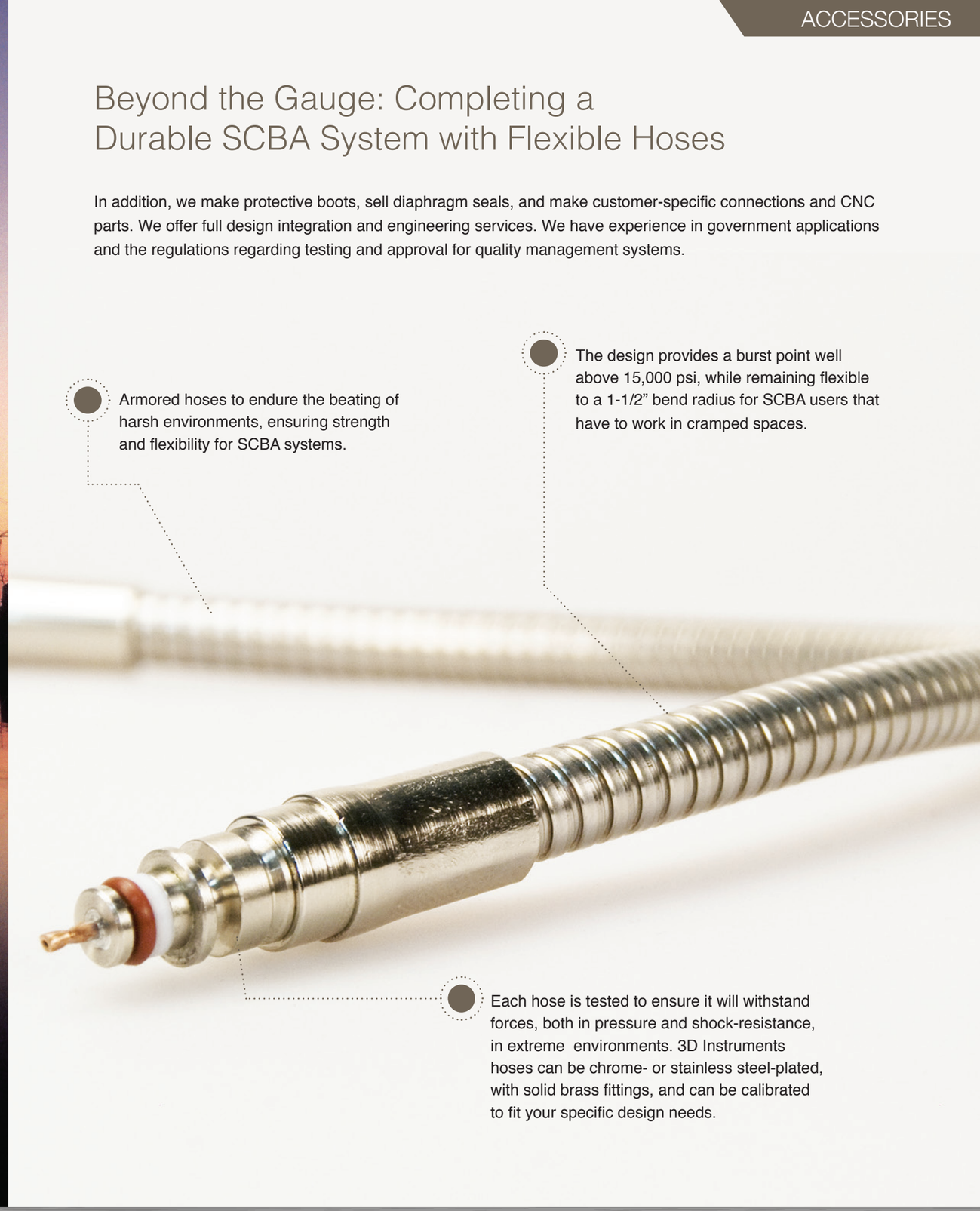
When you need to calibrate the performance of your pressure measuring instruments in severe applications, our test gauges provide unsurpassed long-term accuracy–from 0.25% - 0.1%.

Beyond the Gauge: Completing a Durable SCBA System with Flexible Hoses

In addition, we make protective boots, sell diaphragm seals, and make customer-specific connections and CNC parts. We offer full design integration and engineering services. We have experience in government applications and the regulations regarding testing and approval for quality management systems.

Armored hoses to endure the beating of harsh environments, ensuring strength and flexibility for SCBA systems.

The design provides a burst point well above 15,000 psi, while remaining flexible to a 1-1/2” bend radius for SCBA users that have to work in cramped spaces.



Each hose is tested to ensure it will withstand forces, both in pressure and shock-resistance, in extreme environments. 3D Instruments hoses can be chrome- or stainless steel-plated, with solid brass fittings, and can be calibrated to fit your specific design needs.

3D Instruments, LP
2900 E. White Star Avenue
Anaheim, CA 92806
Tel 714.399.9200
Fax 714.409.3371
www.3dinstruments.com