

# **CUSTOMIZED** **Pressure Relief Products**

7-8803-7



**Continental Disc<sup>®</sup>**  
**Corporation**

*Performance Under Pressure<sup>®</sup>*

## Solutions...for Tough Pressure Relief Problems

Whether it's from the standard product line – or a custom-designed rupture disc for a one-of-a-kind application – Continental Disc Corporation has built a reputation for solving the toughest pressure relief problems for:

- OEM's
- Defense Industries
- Space exploration program
- Aircraft and aerospace manufacturers
- The chemical and petrochemical industries
- Food processors
- The electronics industry, and countless more.

## Problem Solving

Continental Disc Corporation's custom design capabilities have been tapped for such wide ranging projects as air conditioning units, oxygen supply systems, aircraft ejection seats, sonobuoys and the space shuttle. The same engineering, testing and manufacturing talent that has solved one-of-a-kind problems for worldwide industries is now available to deliver innovative solutions to your own specific pressure relief problems.

## Working With Specialized Technologies...Like Yours

Solving pressure relief problems for you is the special role played by C.D.C.'s Product Development Group and the Special Products Group. This pool of product development expertise has been retrofitting C.D.C. designs into clients' systems since 1965. They are engineers who are at home with special or exotic materials, ultrahigh or ultralow burst pressures, as well as state-of-the-art processing and testing requirements.

Whether your needs are for quantities of one, one thousand, or more, Continental Disc is ready to solve your pressure relief problems. Contact our corporate office in Liberty, Missouri or one of our overseas offices located in The Netherlands, Germany and the United Kingdom. The back cover lists specific addresses and phone numbers to help locate the representative nearest you.

## The Role of Rupture Discs

Rupture discs are non-reclosing pressure relief devices which open within milliseconds when system pressure reaches its specific burst rating.

They are designed to relieve either positive or negative conditions at a specified set pressure and in some applications, additionally withstand vacuum or backpressure. Rupture discs may also be designed to provide dual relief (positive or negative) within the same rupture disc.

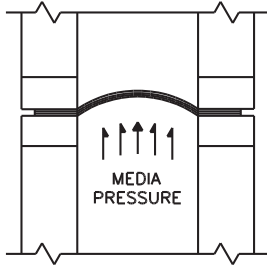
A rupture disc opens (relieves) within milliseconds. This instantaneous and unrestricted relief capacity allows the rupture disc to be used:

- As the PRIMARY relief device
- As a SECONDARY relief device to a pressure relief valve
- As a relief device in COMBINATION series with a pressure relief valve  
OR
- As a QUICK OPENING device for pressure transfer

Continental Disc Corporation manufactures and tests under an ISO 9001 Certified Quality System. Whether your needs include special or exotic materials, ultrahigh or ultralow burst pressures, our Engineering, Manufacturing and Testing facilities are ready to serve your needs.

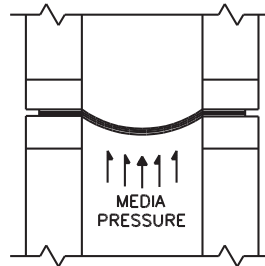


There are two basic designs of rupture discs that can be configured into many different envelope packages to suit your application, Tension Type discs and Reverse Acting discs. Both designs are compatible for seal welding (Hermetic Seal).



**TENSION TYPE:**

- Operation to 80% of burst rating
- Available in non-fragmenting design
- Good cyclic or pulsating service life
- Good corrosion resistance



**REVERSE ACTING TYPE**

- Operation to 90% of burst rating
- Designed for non-fragmentation
- Excellent cyclic or pulsating service life
- Improved corrosion resistance
- Less affected by elevated temperatures than tension type

C.D.C. manufactures rupture disc assemblies with pressure ranges from 6" water column to 80,000 psig and for temperature conditions from cryogenic to 1000°F. Depending upon the type of rupture disc used, TENSION or REVERSE ACTING, a manufacturing range and burst tolerance is applicable.

stamped with the rated burst pressure. The rated (stamped) burst pressure is established by bursting a minimum of two discs and averaging the pressure at which the rupture discs burst. This average is the rated (stamped) burst pressure of the rupture disc.

pressure at which each rupture disc bursts. This average is the rated (stamped) burst pressure. A tolerance is then applied to this pressure to determine the maximum expected variation from the rupture disc's rated (stamped) burst pressure.

## Manufacturing Range

Manufacturing Range is defined as the allowable pressure range within which a rupture disc is rated. It is based upon the customer specified burst pressure. After the rupture disc has been manufactured and tested, it is

## Burst Tolerance

In accordance with ASME Code, a tolerance is applied to the rated burst pressure of a rupture disc. The rated (stamped) burst pressure is established after the rupture disc has been manufactured by testing a minimum of two rupture discs and averaging the

As per ASME Code, a rupture disc is designed with a burst tolerance of  $\pm 2$  psig for pressures under 40 psig and  $\pm 5\%$  for pressures 40 psig and above. Refer to the table below for the applicable manufacturing range and burst tolerance for tension and reverse acting rupture disc designs.

Rupture Disc Type	Specified Burst Pressure Rating		Manufacturing Range		Burst Tolerance
	psig	barg	% Under	% Over	
Solid Metal Tension	2 - 5	0,138 - 0,345	-40	+40	$\pm 2$ psig
	6 - 8	0,414 - 0,552	-40	+40	
	9 - 12	0,612 - 0,815	-30	+30	
	13 - 14	0,896 - 0,955	-10	+20	
	15 - 19	1,03 - 1,31	-10	+20	
	20 - 39	1,38 - 2,69	-4	+14	
	40 - 50	2,76 - 3,45	-4	+14	$\pm 5\%$
	51 - 100	3,52 - 6,90	-4	+10	
	101 - 500	6,96 - 34,48	-4	+7	
	501 - up	34,54 - up	-3	+6	
Cross Scored Tension	40 - up	2,76 - up	-10	+0	$\pm 5\%$
Reverse Acting	15 - 39	1,03 - 2,69	-0	+0	$\pm 2$ psig
			-2.5 psig	+0	
			-5 psig	+0	
	40 - 49	2,76 - 3,38	-0	+0	$\pm 5\%$
			-2.5 psig	+0	
			-5 psig	+0	
50 - up	3,45 - up	-0	+0		
		-5%	+0		
		-10%	+0		

**NOTES:**

1. Special reduced manufacturing ranges can be obtained. 1/2, 3/4 or min/max ranges are available upon request. Please consult your Continental Disc Corporation representative or the factory for additional information.
2. Burst tolerances are the maximum expected variation from the rupture disc's rated (stamped) burst pressure.
3. Continental Disc Corporation can manufacture rupture discs to comply with ASME Code requirements.

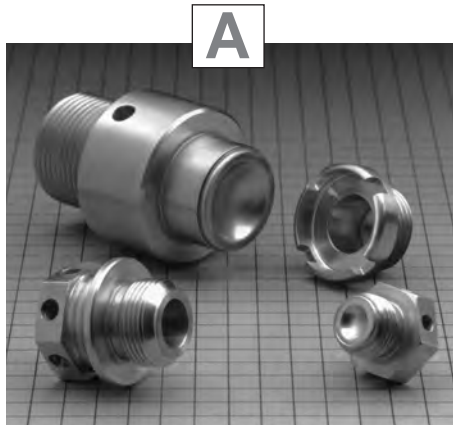
# CUSTOMIZED FOR SPECIFIC NEEDS

## High Pressure Assemblies

In the chemical industry, many applications require high pressure systems in order to obtain specific chemical reactions. Many varieties of mating connections are available to meet the high pressure sealing requirements of processing systems, as shown in photo "A" below.

High pressure rupture disc assemblies used in the plastic and rubber extrusion industry often require materials from one mil (.001") to sheet or plate thickness. Some examples are shown in photo "B".

C.D.C. maintains a complete stock of coil and sheet materials in graduated thicknesses, including 316 Stainless Steel, Monel<sup>®\*</sup>, Nickel, Inconel<sup>®\*</sup>, and Hastelloy C<sup>®\*\*</sup> to supply the burst pressure requirements of our customers. Exotic alloys such as titanium, tantalum or niobium are also available.

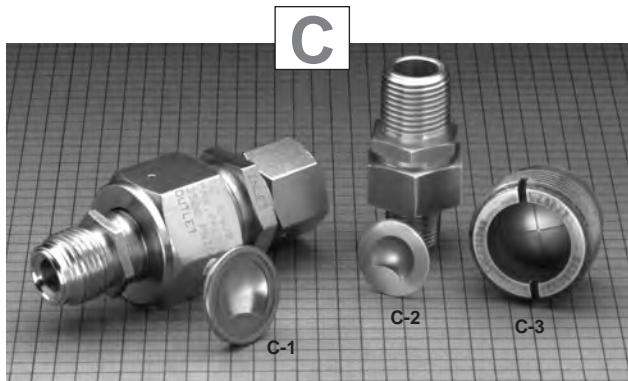


**Typical applications:**  
 Down-hole Drilling System (Liquid)  
 Specialty Valves for Aircraft Oxygen Systems (Gas)  
 Missile/Rocket Pressure Vessel Relief (Gas)  
 Aircraft Evacuation Systems (Gas)

## Non-Fragmenting Designs

Continental Disc Corporation has the experience, technology and manufacturing techniques to provide rupture discs in various sizes and shapes designed for non-fragmentation. This design may involve a variety of scoring techniques, passive and active mechanical opening devices or petal retention designs.

Photo "C" shows three non-fragmenting design units. C-1 and C-2 are reverse acting "replaceable" rupture disc assemblies. C-3 is a cross scored tension type design, suitable as a "Quick Opening" relief device actuated by an independent means.

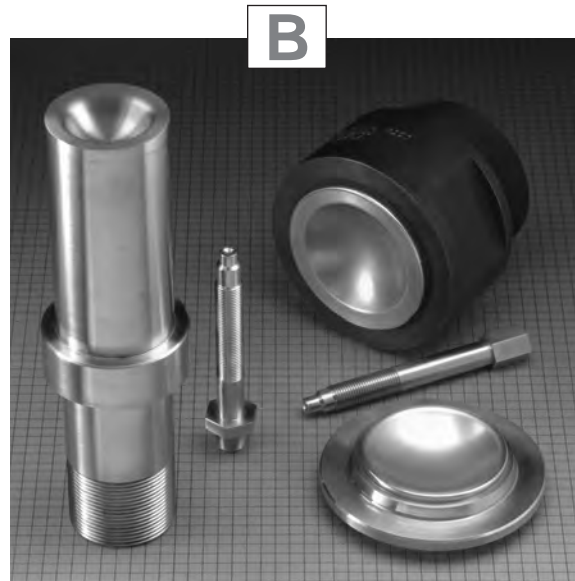


**Typical applications:**  
 Gas Panels for Purity/Toxic Gas  
 Missile/Rocket Quick-Opening Valve  
 Air Conditioning/Refrigeration Storage Vessels  
 Air/Hydraulic Accumulators and Compressors  
 Automotive/Aircraft Safety Restraint Systems

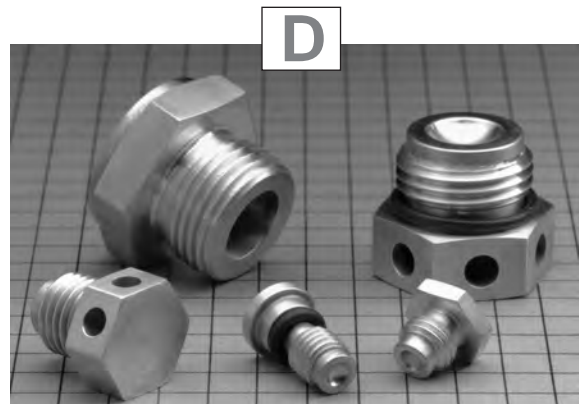
## Hermetic Seals

Various weld designs and methods are used to achieve sealing between the rupture disc and body assembly. Examples in photo "D" are pressure plugs used in hydraulic and liquid applications. The rupture disc is welded to the top of a specially designed body plug. Weld seals are used when leakage is of critical concern. Weld seal integrity can be tested at C.D.C. by mass spectrometry to sensitivity levels of  $1 \times 10^{-9}$  Atm. cc/second helium.

**NOTE:** All products were photographed on a 1/4" grid for scale.



**Typical applications:**  
 Rubber, Plastic and Composite Material Extrusion Machine  
 Reactor Vessel Process Piping (Petrochemical/Power Industry)  
 Marine and Offshore Piping/Vessel Pressure Relief



**Typical applications:**  
 Aircraft Tire/Wheel Assemblies  
 Nitrogen Gas Springs/Manifolds  
 Pneumatic Air Dryers

\* Monel and Inconel are registered trademarks of the Inco family of companies.  
 \*\* Hastelloy is a registered trademark of Haynes International.

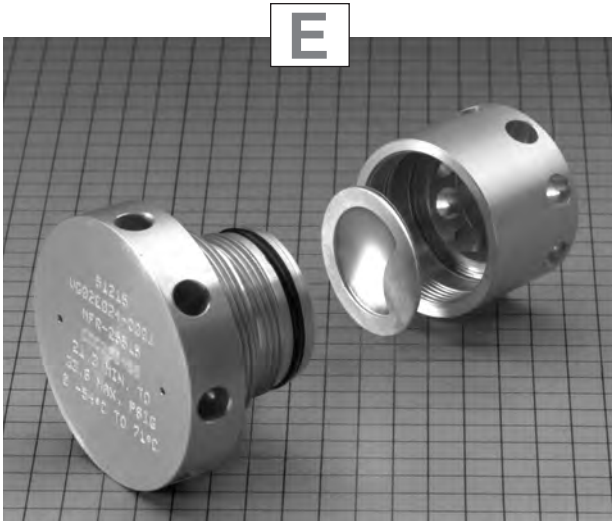
## Unique Applications

In aerospace and aircraft applications, weight restrictions of system components often dictate the type of rupture disc design and/or materials used. In photo "E", a threaded design is used, encapsulating the replaceable rupture disc within an aluminum body. The light weight characteristics of aluminum make it possible to meet the weight restriction specified.

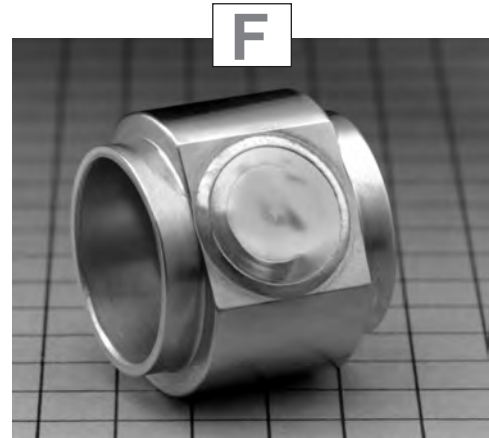
Some unique applications are developed for "one-time use" and are thrown away when the rupture disc has burst. The assembly in photo "F" is a throwaway unit and provides protection for a pressure blanket on electronics components.

Titanium and other exotic alloys are frequently required for the advanced technology applications of the defense and aerospace industries. Photo "G" is a welded reverse acting rupture disc assembly used in a fuel generation system. This rupture disc assembly is the primary safety component used in case of an overpressure condition. (The photo shown is "ghosted" for illustration purposes.)

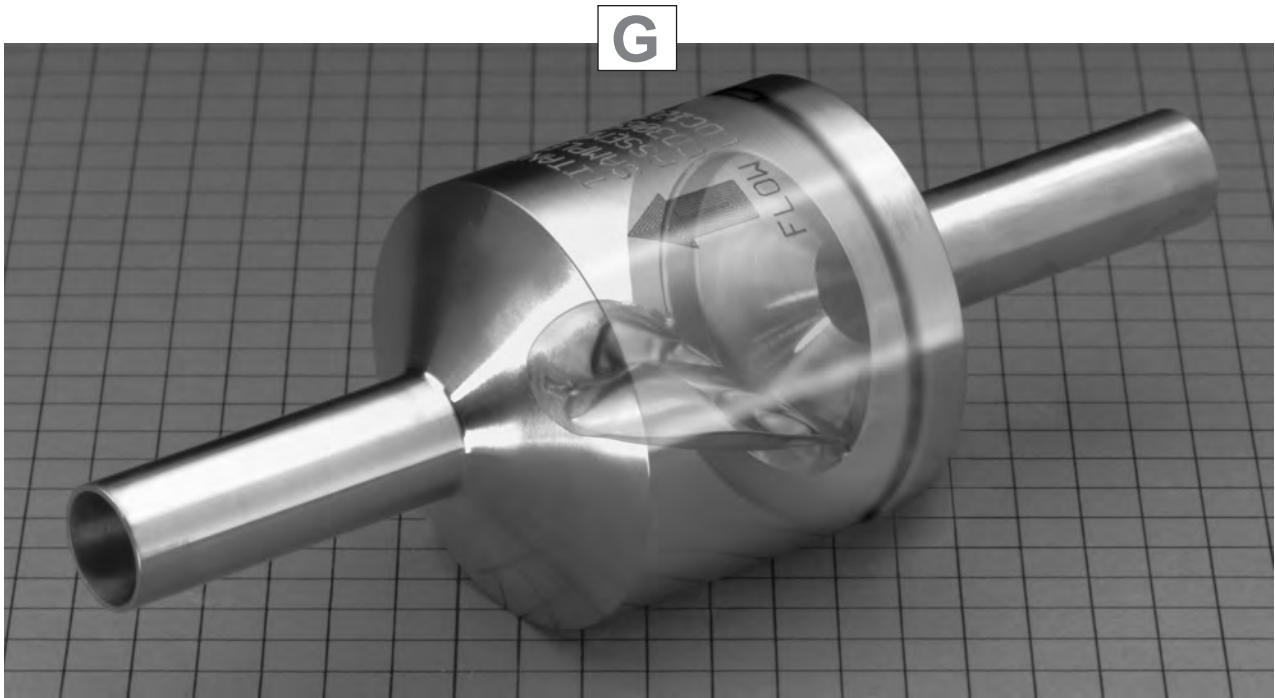
**NOTE:** All products were photographed on a 1/4" grid for scale.



**Typical applications:**  
Coolant Gas Vessel Isolation for Electronics  
Cryogenic Jacketed Vessel Protection



**Typical applications:**  
Electronics Pressure Components



**Typical applications:**  
Aerospace Fuel Generation (Gas/Liquid)

# CUSTOMER ASSURANCES

## CUSTOMER SERVICE

Our working relationship with customers is developed before the sale to better understand your needs, then provide fast, specific quotations and recommend the appropriate products for each application. After the sale, we provide the necessary technical assistance, training and support. Our unique emergency shipping program ensures receipt of the product when urgently needed.

## Design and Engineering

C.D.C. product excellence begins in the design and engineering department where a highly trained technical staff utilizes state-of-the-art computer aided drafting and design (CAD) equipment and product development laboratory facilities.

*Our extensive testing facilities provide the engineering staff with the ability to construct prototype model-making, feasibility studies or complete research and development programs.*

They provide the technical support to the production department, working as a team to develop products that meet and often exceed the customer's requirements.

## Manufacturing

C.D.C. can provide advanced manufacturing capabilities such as complete metal machining and fabrication, Computer Aided Manufacturing (CAM), metal surface treatment (platings, coatings, passivation and anodizing), welding and soldering. Types of rupture disc testing include life cycle, leakage and burst testing at cryogenic and elevated temperatures.

Non-destructive testing (NDT) capabilities include mass spectrometry, gas leak/proof pressure, liquid penetrant, radiography, ultrasonic, metallographic, magnetic-particle, eddy current and more.

C.D.C. maintains an ASME accepted flow laboratory to conduct flow testing for rupture discs and disc/valve combination tests.

Upon request, C.D.C. can manufacture customized rupture disc assemblies to meet the standards of ASME Section III or VIII, EN, BSI, ISO, or other code standards as required. Additional testing charges may apply – contact the factory.

## Quality Assurance

Guided by Corporate policy of meeting customer expectations, C.D.C.'s TOTAL QUALITY Program begins with the inquiry. We incorporate planned quality assurance activities throughout the design, planning, prototype fabrication, manufacture and testing of customized rupture disc assemblies to provide the best Quality of Service, Quality of Workmanship and Quality of Product available in the industry.

The written quality assurance program and supporting procedures meet the requirements of ISO 9001, 10-CFR-50 Appendix B, and national and international standards for measuring and test equipment control and calibration and inspection systems.

Complete documentation of quality assurance compliance with your requirements is maintained. Material test reports, results of destructive and non-destructive testing and inspection activities are available upon request.

When ordering from C.D.C. your specifications and quality requirements become ours. Our technical know-how and TOTAL QUALITY approach to meeting your expectations ensures the best possible performance.

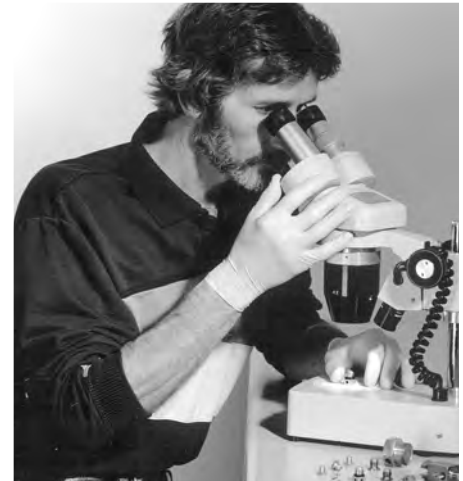
As we believe at C.D.C., there is no performance like  
*"PERFORMANCE UNDER PRESSURE"*



The C.D.C. engineering staff utilizes finite element analysis for flow modeling and a CAD-CAM system for design and machining of flow test apparatus and test objects.



The Optical Comparator is used for small parts which are difficult to accurately measure by manual methods. Enlarged detail, vertical and horizontal measuring capabilities and profile projection allow the precise measurement of features such as radii, thread profile and angles.



Visual product analysis sampling is conducted using video microscopy when requested.

Duplicate copies of this  
**SPECIAL RUPTURE DISC APPLICATION FORM**  
can be made on a copier for your use.

**CUSTOMER:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**MARKET TYPE:** ( ) AEROSPACE ( ) OEM ( ) OTHER  
( ) MILITARY ( ) COMMERCIAL ( ) \_\_\_\_\_  
( ) INDUSTRIAL ( ) \_\_\_\_\_

( ) NEW ( ) REPLACEMENT ( ) RE-DESIGN

CUSTOMER P/N \_\_\_\_\_

**PROCESS DATA:** MEDIA: ( ) Gas ( ) Liquid ( ) Gas & Liquid Combination \_\_\_\_\_

MAX OPERATING PRESSURE \_\_\_\_\_ ( ) CYCLIC ( ) PULSING

MAX VACUUM \_\_\_\_\_ ( ) BACKPRESSURE

BURST PRESSURE \_\_\_\_\_ TEMPERATURE \_\_\_\_\_

MFG. RANGE: From \_\_\_\_\_ To \_\_\_\_\_ @ \_\_\_\_\_ °F / °C

**LEAKAGE REQUIREMENTS:** \_\_\_\_\_

**QUANTITIES:** Prototype \_\_\_\_\_ Production \_\_\_\_\_

**SIZE:** DISC SIZE \_\_\_\_\_ FLOW CAPACITY \_\_\_\_\_

INLET SIZE \_\_\_\_\_ CONFIGURATION \_\_\_\_\_

OUTLET SIZE \_\_\_\_\_ CONFIGURATION \_\_\_\_\_

SEAL CONFIGURATION of Rupture Disc (Seal Weld, O-Ring, Face Seal Bead, etc)  
\_\_\_\_\_

**MATERIAL:** RUPTURE DISC \_\_\_\_\_ INLET \_\_\_\_\_ OUTLET \_\_\_\_\_

**OPTIONAL MATERIALS:** \_\_\_\_\_

**CLEANING REQUIREMENTS:** \_\_\_\_\_

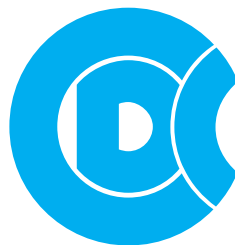
**SPECIAL TESTING REQUIREMENTS:** (LEAK/BURST/CYCLE) \_\_\_\_\_

**NON-FRAGMENTING DESIGN REQUIRED:** YES / NO **PRICE RANGE:** \_\_\_\_\_

**PACKAGING REQUIREMENTS:** \_\_\_\_\_ **ANNUAL USAGE:** \_\_\_\_\_

**MARKING REQUIREMENTS:** \_\_\_\_\_ **DELIVERY REQUIRED:** \_\_\_\_\_

**DIMENSIONAL ENVELOPE:** \_\_\_\_\_



# Continental Disc<sup>®</sup> Corporation



ASME Code Symbol Stamp  
Available When Specified



China Manufacture License  
Available When Specified



Pressure Equipment Directive  
Available When Specified

Continental Disc Corporation has representatives located throughout the world.  
Contact the Continental Disc Corporation office nearest you for the authorized representative in your area.

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