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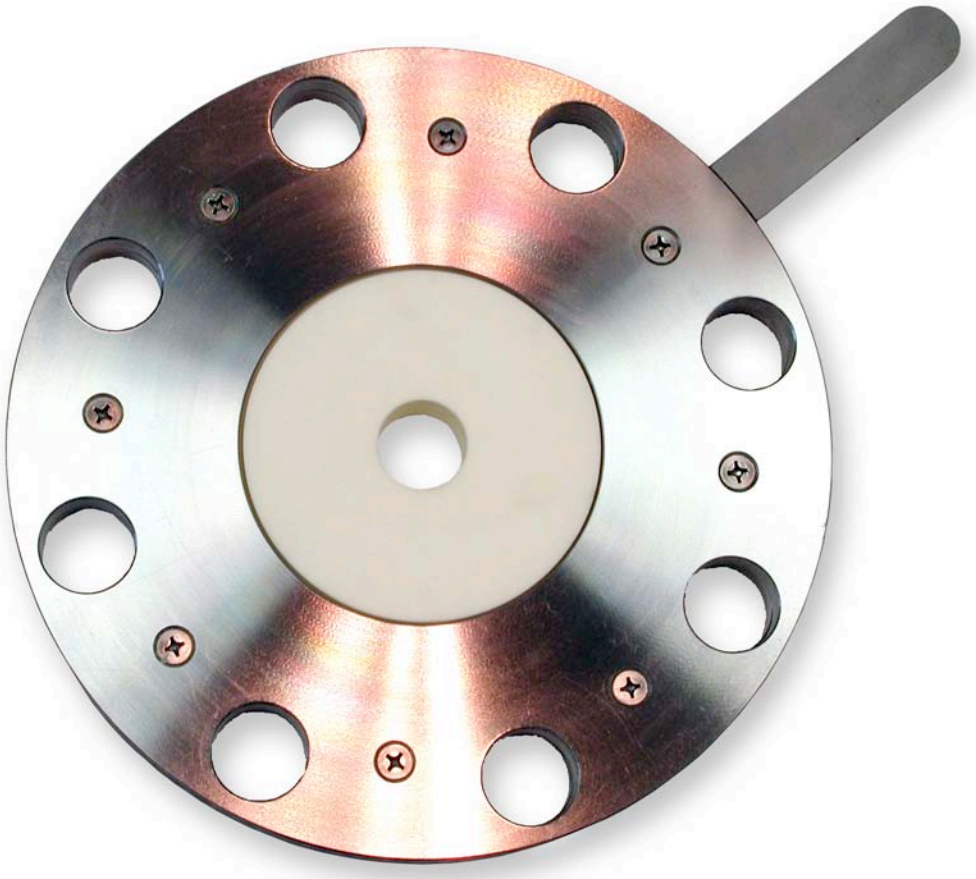
Ceramic Restriction Orifice Plate

Installation and Reference Manual

Ceramic Restriction Orifice Plates



WARRANTY

Ceresist warrants that the Goods manufactured or Services provided will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Ceresist, whichever period expires first. Consumables and Services are warranted for a period of 90 days from the date of shipment or completion of the Services. Products purchased by Ceresist from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer. Buyer agrees that Ceresist has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Ceresist thereof in writing during the applicable warranty period, Ceresist shall, at its option, promptly correct any errors that are found by Ceresist in the Products or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods found by Ceresist to be defective, or refund the purchase price of the defective portion of the Goods or Services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Ceresist are not covered by this limited warranty, and shall be at Buyer's expense. Ceresist shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Ceresist representative. All costs of dismantling, reinstallation and freight and the time and expenses of Ceresist's personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Ceresist. Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Ceresist and can be amended only in writing signed by an authorized representative of Ceresist. Except as otherwise expressly provided in the Agreement, there are no representations or warranties of any kind, express or implied, as to merchantability, fitness for particular purpose, or any other matter with respect to any of the goods or services.

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Ceresist shall not be liable for damages caused by delay in performance. The sole and exclusive remedy for breach of warranty hereunder shall be limited to repair, correction, replacement or refund of purchase price under the limited warranty clause herein. In no event, regardless of the form of the claim or cause of action (whether based in contract, infringement, negligence, strict liability, other tort or otherwise), shall Ceresist's liability to buyer and/or its customers exceed the price to buyer of the specific goods manufactured or services provided by Ceresist giving rise to the claim or cause of action. Buyer agrees that in no event shall Ceresist's liability to buyer and/or its customers extend to include incidental, consequential or punitive damages. The term "consequential damages" shall include, but not be limited to, loss of anticipated profits, loss of use, loss of revenue and cost of capital.

Notice

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Section
1

Introduction

Description

Thank you for your purchase of Ceresist Ceramic Restriction Orifice Plates.

Ceresist ceramic restriction orifice plates have been designed and manufactured to be a long-term solution to rapid bore wear in aggressively erosive, corrosive, or cavitating services. In order to ensure that our orifice plates will endure high differential pressures and/or high percent solids fluids, we have standardized upon sintered ceramic as our material of choice for the orifice insert.

Based upon the selection of ceramic material, our installation history has shown that ceramic outlasts 300-series stainless steels by approximately 32 to 36 times, and Hastelloy-C 276 by approximately 24 times. Furthermore, taking into account the additional thickness of our orifice plates versus the 1/8" thickness of standard metal orifice plates, this will project the service life of our orifice plates well into the future.

Ceresist ceramic materials are also chemically inert to a very wide range of fluids utilized in manufacturing industries, and will therefore not degrade due to corrosion.

The ceramic orifice insert terminates outside of the pipe ID — and therefore is the only material exposed to the process. This ensures a product of great longevity, with ceramic protection throughout.

Important Instructions

Read all instructions prior to installing, operating, and servicing the product.

Ceresist designs, manufactures, and tests its products to meet many national and international standards. These products must be properly installed according to the local and national standard(s) and/or codes applicable in the location of use and as specified in the installation instructions. To ensure proper performance, qualified personnel must be assigned to install, operate, and maintain the product. Products must be used and maintained to ensure they continue to operate within their design specifications. The following instructions must be adhered to and integrated into your safety program when installing, using, and maintaining Ceresist products.

Please contact Ceresist if clarification is required on any aspect of the installation, maintenance, or use of this product. Follow all warnings, cautions and instructions marked on and supplied with the product and within this manual.

If replacement parts are required, ensure that qualified personnel use only replacement parts sourced from Ceresist or a Ceresist representative. Unauthorized parts can affect the product's performance and place the safe operation of your process at risk. Substitute parts that have not undergone our quality procedures may result in severe damage to equipment, personnel injury, or death.

Section
2

Receipt of Product

Receiving and Inspection

Ceresist Ceramic Restriction Orifice Plates are available in many sizes and configurations. It is therefore important to inspect and verify that the orifice plate that you have received is the appropriate model.

Upon receipt of the shipment, check the packing list against the material received and the purchase order. All items are tagged with a model number, serial number, and customer tag number (if provided).

Care must be taken to ensure the orifice plates are not dropped, or otherwise subjected to shock that may damage the ceramic insert.

Product Damage

Inspect the orifice plate assembly for any damage that may have occurred during transit. The stainless steel surfaces should be free of dents, scratches, and overall damage. The ceramic insert must be intact without any chipping or cracks.

Immediately report any damage to the carrier and to Ceresist. The original packaging and packing materials must be saved for inspection by the carrier; otherwise, a claim may not be adequately processed.

Returning the Product

To expedite the return process, call Ceresist at (800) 219-4945 or at (973) 345-3231. Please have the following information available so that we may be able to assist you in the most expeditious manner:

- Your Purchase Order Number
- Date of Order
- Shipping Address
- Orifice Plate Model Number
- Orifice Plate Serial Number
- Fluid that the orifice plate was exposed to.

Most of the order information may be found on the paddle which is welded onto the orifice plate holder. We will assist you with and further needed information or materials. A Returned Goods Authorization Form — which will be provided to you — must be completed to properly track and handle your product upon receipt at Ceresist.

Hazardous Materials

If a hazardous substance is identified, a Material Safety Data Sheet (MSDS), which is required by law to be available to people exposed to specific hazardous substances, must be included with the returned materials.

The product must be cleaned and decontaminated before return to Ceresist.

Functional Limitations

Temperature Limit

Standard Design	350° F
High-Temperature Design	1,000° F

Maximum Working Pressure Flange Rating per ASME B16.5

Section
3

Installation

Preliminary Steps

Record the orifice plate data for future reference. Always provide the serial number and model number of the orifice plate when ordering spare parts. It is the responsibility of the end user to install the orifice plate in a well-designed piping system.

Before installing the orifice plate into the line, clean the piping, flanges, and orifice plate of all foreign material such as welding chips, scale, oil, grease, and dirt.

Gasketing Materials and Specifications

A set of two full-face gaskets are required per orifice plate. Appropriate gasketing materials include the following:

- Elastomer without fabric;
- Compressed sheet suitable for the operating conditions;
- Fluropolymer, elastomer with cotton fabric insertion;
- Eastomer with or without wire reinforcement;
- Vegetable fiber.

Consideration should be given to the effects that the contained fluid may have upon the gasket including damage that may result from partial disintegration of the gasket material from the effects of erosion or cavitation.

Straight Run Requirements

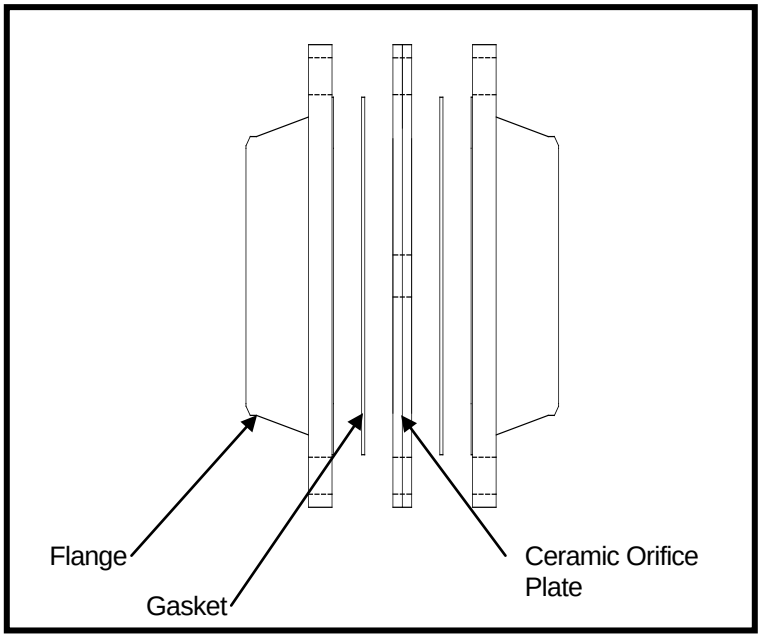
Ceresist Ceramic Restriction Orifice Plates are not metering devices, and therefore their performance is not negatively affected by their specific location within the piping system. However, turbulence created by upstream control valves or fittings may have an effect on the longevity of the ceramics.

If the ceramic orifice plate is used to restrict flow or pressure to the extent that the fluid cavitates, we do recommend that it is installed a safe distance away from the next component in the piping system.

If space permits, we recommend the orifice plate be installed five to ten pipe diameters away from any components upstream or downstream.

Installation

- Determine where the orifice plate is to be placed within the piping system. The orifice plate is installed "wafer-style" between two flanges.
- Establish the proper orientation as determined by the intended application. Orifice plates without drain or vent holes may be installed in any orientation and any direction of flow.
- Provide and install full-face gaskets on both sides of the orifice plate. Any gasket material as described above is appropriate.
- Place nuts and bolts or studs though the upstream flange, the orifice plate, and downstream flange. Tighten sufficiently ensuring that that the gaskets are uniformly compressed to the proper design loading according to gasket manufacturer's recommendations. An alternating, star-pattern is critical for flange bolt tightening, ensuring that one-third of the final torque is achieved with each pass, until the final torque has been achieved.
- Check for leaks.
- Commission the orifice plate.



Section
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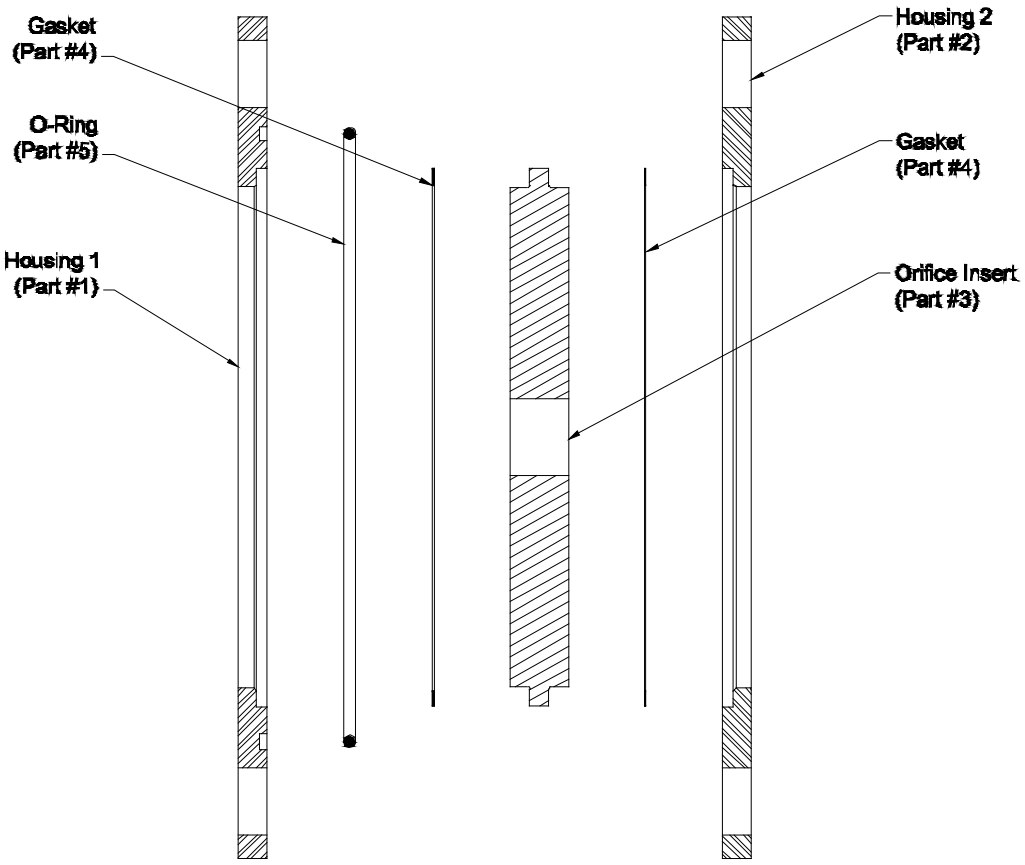
Bill of Materials



Part Number	Description	Material	Quantity
1	Housing 1	SS 304/304L	1
2	Housing 2	SS 304/304L	1
3	Orifice Insert	Sintered Silicon Carbide Ceramic	1
4	Gasket	PTFE	2
5	O-Ring	Viton	1
6	Paddle	SS 304/304L	1
7	Bolts	SS 304/304L	Varies

Section
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Contact Information

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support@ceresist.com

Phone and Fax Numbers

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