

General

What is a Rupture (Bursting) Disc?

A non re-closing pressure relief device designed to relieve excess over-pressure or vacuum conditions at a pre-determined pressure or temperature.

Does a Rupture (Bursting) Disc replace the Pressure or Safety Relief Valve?

Not always.

Increasingly, engineers are using a rupture disc in combination with their traditional valve to enhance the pressure relief solution and achieve the most cost effective explosion protection.

Using a rupture disc in addition to a valve means the system benefits from the unique advantages of each individual solution, whilst maintaining a reasonable cost. Process leakage into the atmosphere is kept to a minimum and valve life is extended by isolating corrosive fluids from internal valve parts. As secondary protection, discs also offer a back up in case of downtime and can enhance the SIL level of the system by adding layers of protection. For safety-critical applications, “doubling up” in this way not only offers greater protection to the infrastructure of a process plant, but also to its people.

Technical

What different disc types are available?

There are two main categories of disc designs;

- 1; Forward acting (tensile loaded).*
- 2; Reverse acting (compression loaded).*

However, graphite and custom design (OEM) discs are also available.

How do I know which type of disc to specify?

The most suitable disc will depend on the required burst pressure and the individual application conditions. Elfab’s product selector tool available online through ElfabTech offers guidance with this. However, as a safety-critical part of the plant equipment we would always recommend speaking to an Elfab specialist to specify the correct disc for any application.

What information is needed in order to be able to specify the correct disc?

Specification variables to consider when choosing the correct disc include required burst pressure, burst temperature, whether the application is one phase or two phase, whether it must be a non-fragmenting design, and whether the disc has to withstand full vacuum. There are several other factors to consider – please consult an Elfab representative for further details.

How leak tight are bursting discs?

This varies with the disc design and application detail. From 1×10^{-3} std cc/sec to 1×10^{-8} for Electron beam welded devices.

What size discs are available?

Elfab can supply discs from 1/8” (3mm) up to 32” (800mm) in diameter.

Can Elfab help me size a disc?

Yes.

By registering for a free account on ElfabTech online, users can access high level engineering calculations to ISO or API520, which have been developed to help determine minimum discharge area requirements for a rupture disc on a pressure vessel containing a gas or a liquid (single phase flow) or those containing both (2 phase flow).

What burst pressures are available?

Elfab can supply discs with a burst pressure ranging from 3 mbarg up to 1400 barg. Conditions apply.

What burst pressures are available on OEM plugs?

The burst pressures are available to download through the Elfab website. If you require a different burst pressure to those stated, please ask.

What is working pressure to burst pressure ratio?

This is the margin between the Maximum Recommended Working Pressure for the disc design and the bottom limit of the burst pressure for the disc.

Are Elfab discs UD stamped?

Conformance with ASME VIII requirements is ultimately indicated by a UD stamp on the disc tag. Permission to apply this stamp comes only after an audit by ASME and flow testing of the disc type to determine the flow coefficient, or K_r , value. This audit process takes about 4 to 6 months. If UD stamping is required, please make this clear when discussing your requirements.

Elfab discs that are currently ASME 'UD' approved include the following:

- Opti-Gard™ Reverse-acting Rupture Disc
- Opti-Gard™ High Strength Magnet Reverse-acting Rupture Disc
- Safe-Gard Forward-acting Rupture Disc
- Flat Composite Rupture Disc
- Domed Composite Rupture Disc
- Universal Arma-Gard™



At what temperature do you specify the rupture disc?

The specified temperature is the temperature to which the disc is exposed when it is required to rupture.

What is a temperature coefficient?

Temperature coefficients were widely used by suppliers as a correction factor between the burst pressure at ambient temperature and the burst pressure at the coincident temperature.

Are temperature coefficients still used?

Very little.

International Standards have moved towards a requirement for test bursts to be carried out at the coincident temperature. Where possible under ISO Elfab will always manufacture to the ambient burst pressure.

How does temperature affect the burst pressure of the disc?

The burst pressure will generally reduce as the temperature increases, and vice versa. However, this is dependent on the disc type and the material used. Please ask for further information.

Are discs suitable for use with Gas, Vapour and Liquid applications?

This depends on the disc type and specification.

Please refer to individual product datasheets for more information.

Can the disc be used on Oxygen clean duty?

Discs can be supplied cleaned for use in Oxygen Service at a nominal extra charge.

Does Elfab have experience with discs in exotic materials?

Yes.

Elfab can manufacture discs in Inconel, Stainless Steel, Nickel, Hastelloy, Tantalum and Monel. The most suitable materials will depend on the specific operating conditions.

Will a disc withstand back pressure or vacuum?

This depends on the disc design being used. Reverse-acting discs like Opti-Gard™ will withstand full vacuum without the need for vacuum support, but other designs may require this. Details on individual product specifications can be found on the Elfab website. Vacuum conditions should be specified with the request for quotation.

Can a Rupture (Bursting) Disc be used in applications other than pressure relief?

Yes, discs are used as pressure switches. For example to enable the controlled activation of propellant systems by bursting and therefore allowing the two mediums to mix.

What if I cannot find what I need on the website?

Alongside its standard range, Elfab design and offer customised solutions to meet your exact specification requirements. If you cannot see anything suitable, please contact us directly to discuss your individual application in more detail.

Where do I go for additional technical support?

Firstly, you can refer to the wealth of additional resources available through the ElfabTech portal on the Elfab website. If you still cannot find what you need, you can locate your nearest contact through the Elfab website.

My disc keeps bursting too often, what could be the problem be?

A number of factors come in to play which can affect the performance of the disc. Elfab can assist you in any investigation to try and clarify the cause of burst. Possible issues could include the following:

- Deteriorating condition of the disc
- Incorrect installation of the disc and/or holder
- The installation could be exceeding the specified maximum operating ratio
- Damage to the disc

Installation and Use

How does the Rupture (Bursting) Disc fit into my system?

Generally discs are fitted into a holder and mounted between pipe flanges, but they can also have screwed connections, or a variety of custom designed mounting arrangements depending on the particular application. Please refer to the specific installation instructions when fitting. Elfab can offer training to help your teams understand the importance of correct Rupture Disc installation.

How do I know that I have the correct disc?

The disc will carry a tag, which will show all the relevant performance details of the disc. As an absolute minimum the disc will carry the Elfab contract number, which can be traced to the test certificate and checked for the correct specification. Additional markings can be added to the disc tags to identify its unique location within your plant.

Can I fit a Rupture (Bursting) disc into another manufacturer's holder?

No.

As specified by the Pressure Equipment Directive, one manufacture's rupture disc cannot be placed into another manufacture's rupture disc holder. All Elfab product certifications relate to the **Rupture Disc Device**, comprising of an Elfab disc in an Elfab holder only. Installing product in alternative holders will invalidate the CE marking, warranty and insurance.

How do I know I have the correct holder for the disc?

The disc should be marked with the reference of the holder in which it should be used.

How do I know that the holder is fitted into the pipe work in the correct orientation to flow?

Elfab uses a fixed bracket (System-loc) on the flange inlet, which forces the holder orientation. Each Elfab holder is also laser etched with a flow arrow to enable correct installation within the system.

How do I know the disc is fitted correctly into the holder?

A disc will only fit into the correct holder one way. A reverse-acting disc will not fit into a forward-acting holder and it should not be adapted to do so. Various techniques have been used to ensure that the disc is fitted correctly:

- Reverse-acting disc - Disc Alignment Tag or Key
- Forward-acting disc - Pin in holder, and slot in disc tag.

If the disc includes the Flo-Tel magnetic burst detection system, the Test-Tel installation aid is designed to confirm correct installation. You can download a copy of the appropriate Installation Instructions from the Elfab website (www.elfab.com)

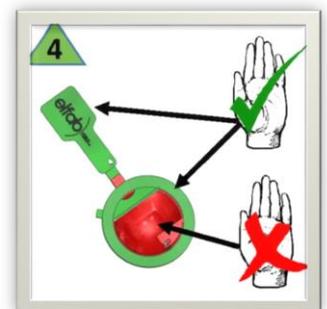
The best method to prevent installation problems is to ensure your team is fully trained. If you would like to book an onsite training seminar on any aspect of the Elfab product range, contact your local representative to discuss your requirements.

Is it OK to install a damaged disc?

No.

Any visible damage to the disc dome may lead to premature burst.

Please note: Correct handling of a disc is important. The disc should be gripped around the outer edge and by the tag of the disc. Never lift the disc by the tag alone!



Can I machine the holder, as it has become damaged through use?

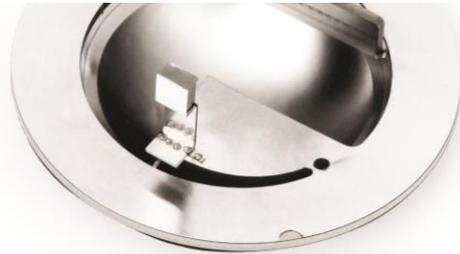
No.

The holder is crucial to the correct functioning of the disc, and therefore any remedial work should only be carried out by the supplier.

How do I know when the disc has burst?

Depending on the installation and complexity of the control system, the easiest solution is a rupture disc with integrated burst detection. The disc comes complete with a small magnet, which is pulled away from the sensor upon burst giving an open circuit signal if installed with the Flo-Tel™ detection system.

Image: Rupture Disc with integrated magnetic burst detection



Can I reuse the holder and just replace the disc after it has burst?

Some applications are more suited to an integral holding device, which is also discarded following a burst.

However, in most cases, the holders are reusable and it is only the disc which needs to be replaced. In the case of a disc with an independent holder and integrated burst detection (as above), only the disc itself has to be replaced after it functions, also eliminating the need to hold stock of detectors.

Image: Non-invasive rupture disc burst detection system



Quality

What Quality Systems does Elfab comply with?

Elfab is accredited to a number of Global standards, including ISO 29001:2010, ISO 9001:2008, ATEX, IECEx, ASME VIII, SELO, CU TR 32, TUV and SIL – go to www.elfab.com/quality-services/quality-certificates-approvals for more information.

What standards are Rupture (Bursting) Discs certified to?

Elfab uses ISO 4126-2 as standard, but can supply to a number of other standards.

The European Standard is EN ISO 4126 part 2.

The American Standard is ASME VIII.

Elfab products have been approved by a variety of different bodies around the World. Full details can be found on the Elfab website: www.elfab.com

What European Directives are relevant to Rupture (Bursting) Discs?

- The Pressure Equipment Directive P.E.D. 97/23/EC.
- Bursting Discs are classed as Category IV equipment.

Are Rupture (Bursting) Discs CE marked?

Yes, provided the application lies within the Scope of the P.E.D. where the burst pressure is above 0.5 barg.

What is supplied with Elfab discs?

A Test Certificate (free of charge) showing details relating to the batch of discs ordered.

Installation instructions are available to download at the Elfab website: www.elfab.com

Other documentation is available on request, such as material certifications, drawings, Certificate of Origin etc.

Are the disc materials used traceable?

Yes.

All disc materials used are traceable and certificates can be supplied on request (EN 10204:3.1).

A nominal charge will be applied.

Which European Directives are relevant to Explosion Venting (Bursting) Panels?

The ATEX Directive 94/9/EC.

Can I get further copies of the Test Certificate?

Yes. There may be a small charge.

Simply provide the Elfab Contract number shown on the disc.

Purchasing

Are the disc and holder supplied assembled as one unit?

No.

Discs and holders must be purchased separately and will be delivered in separate boxes unless specified otherwise at the time of order.

Are Elfab Explosion Vents supplied with integral burst detection?

No.

Elfab offers an optional burst detection system, Vent-Tel, which gives an instantaneous signal of the panel actuation. This will need to be ordered separately if required. Please speak to an Elfab Engineer about your individual application.

Should I keep spare discs?

Yes.

Although Elfab offers an industry-best lead time on all its products, it is always recommended that you hold spare discs to avoid costly downtime in the event of a burst. If no spares are available and the discs are required immediately, Elfab also offers a Fast Track express manufacturing service at an additional cost.

Does the price of the disc change with quantity?

Yes.

Destructive testing is carried out on every batch produced with a test requirement linked to batch size.

So it is always worth planning ahead and ordering higher quantities wherever possible.

Due to the number of different specification rupture discs we have used in the past, we now have hundreds of part numbers in our system. Is there any way of reducing these?

Yes.

Elfab runs a stock rationalization program to support customers in the standardization of their stock holding, leading to more effective purchasing and cost savings. This is possible due to the high Operating Ratio's and tighter tolerances of the Elfab rupture disc range. To find out more about this programme, call us on +44 (0)191 293 1234

Does Elfab keep discs in stock?

No.

Every batch of discs is manufactured specifically to order. We do keep a vast range of raw materials to minimize leads times wherever possible.

What is the lead time for Elfab products?

This varies by product, but overall Elfab offers industry-best lead times of around 4 weeks.

Can the delivery time be improved in the case of an emergency?

Yes.

Elfab's Fast Track Service can significantly reduce the standard lead time to minimize costly plant downtime where necessary. However, there is an additional charge for this. If you are not happy with the lead time you are quoted, simply request a Fast Track quotation.

Is there a charge for this service?

Yes.

To push through a Fast Track order, Elfab has to change its entire production schedule. The higher price covers the potential overtime required to fulfil its orders, as well as any premiums it may be charged for a quicker delivery from its suppliers.

Does Elfab charge for certificates and documentation?

This depends on the certificate. A burst certificate is sent out free of charge with every order. Certain documents like Certificates of Conformity and Material certifications may be chargeable.

Can I track my order?

Yes.

Elfab customers can log into their ElfabTech account online to track their order along its journey through the Elfab factory. Once dispatched, customers can also access the associated DHL tracking number for additional traceability.

What is the standard warranty on Elfab products?

Elfab offers a unique 3-year warranty for its high performance reverse-acting rupture disc, Opti-Gard™. For other products, standard warranty is 12 months in service and 18 months in storage.

Part-Code Information

What do the part codes on each quote mean?

Due to the technical nature of our products, our quotes contain a lot of information about our products. To help you better understand our quotes, below is an example of what some of our part codes symbolize. REMEMBER – this list is not exhaustive and Elfab provide several part-code variations for individual/specific applications. All sizes are in mm.

If you need any further assistance, please don't hesitate to contact us.

Category (What your part code begins with)

- *DSC = Rupture Disc*
- *VNT = Explosion Vent*
- *BPRV = Buckling Pin Relief Valve*
- *ACC = Accessory*
- *DET = Detection*
- *OE = OEM*
- *HLD = Holder*

Material

- *HAL = Hastelloy Fluoropolymer Liner*
- *HAU = Hastelloy Underlined*
- *INL = Inconel Fluoropolymer Liner*
- *INU = Inconel Underlined*
- *MOL = Monel Fluoropolymer Liner*
- *MOU = Monel Underlined*
- *NIL = Nickel Fluoropolymer Liner*
- *NIU = Nickel Underlined*
- *SSL = Stainless Steel Fluoropolymer Liner*
- *SSU = Stainless Steel Underlined*
- *TAL = Tantalum Fluoropolymer Liner*
- *TAU = Tantalum Underlined*
- *GRL = Graphite Fluoropolymer Liner*
- *GRU = Graphite Underlined*

Disc Support (What the end of your part code symbolises)

- *XXX = Without vacuum support*
- *NVS = Non-Opening vacuum support*
- *OVS = Open vacuum support*
- *2WS = Two-way burst – same burst pressure both directions*
- *2WD = Two-way burst – different burst pressure in opposite directions*



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Information provided on these FAQ's is subject to change and can update at any time, if in doubt please contact the relevant Elfab department to discuss further.

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www.elfab.com