

Burst Discs

Also known as rupture discs, or bursting discs

[Click here for our full range of Burst Discs, Blank Plugs, & Fitting Tools](#)

Table of Contents

- 1 – Overview 2
- 2 – Background 2
- 3 – Design & Selection 3
 - 3.1 Sealing & Porting..... 3
 - 3.2 Foil Material Selection..... 3
 - 3.3 Body Material Selection 4
 - 3.4 Burst Pressure & Tolerance 4
 - 3.4 Burst Pressure Adjustment for Operating Temperature..... 4
- 4 – Certification & Traceability 5
- 5 – Testing..... 5
- 6 – Other Burst Disc Types 5
 - 6.1 Dual-Rating Burst Discs 6
 - 6.2 Dual Foil Burst Discs 6
 - 6.3 Bespoke Discs 6
- 7 – Standard Range 6
- 8 – Blank Plugs & Fitting Tools..... 7
- 9 – Storage and Identification 7
- 10 – Contact Information 8

1 – Overview

This guide summarises product information for Benoil Burst Discs.



2.50" Style Burst Disc 2500psi X-Cut w/ Carried O-ring

2 – Background

Benoil has supplied Burst Discs since c.1989. Initially, Burst Disc manufacture was undertaken to facilitate Cement Dart production, which feature a Burst Disc integrated into the dart body. Following the success of these products, customers subsequently requested plain burst discs for oilfield tools. Burst Disc development has continued ever since.

Benoil supplies a large number of stock and custom-made burst discs across a range of pressures, disc nominal IDs or *styles* and port installation options. Burst Discs are pressure relief - or pressure control – devices, and as such their reliability in service is paramount.

Benoil Burst Discs are used increasingly widely in oilfield equipment, including:

- Motor-head assemblies
- Circulation Subs
- Fishing tools
- Completion tools
- Expansion-packer retrieval
- Safety heads
- Downhole tool triggers

- Subsea hydraulic control systems
- Other specialised applications

Unlike conventional industrial rupture discs, which are principally used as over-pressure safety devices, many of our client use Benoil Burst Discs as deliberate triggers to initiate a particular operation.

3 – Design & Selection

Across all applications, rupture discs range from simple shaped metal foils to complex assemblies. Simple discs generally use reusable holders and offer lower cost, whilst integrated assemblies provide greater reliability and accuracy.

Benoil's approach continues to be driven by the demands of the oilfield. Since burst disc failure can incur substantial downtime, lost production, safety, environmental concerns, and recovery costs; Benoil focuses on integrated burst disc assemblies.

Benoil's Burst Disc assemblies are welded, with the foil secured between two machined rings. This ensures disc orientation is pre-determined mitigating leakage paths, reducing the risk of installation errors, and improving reliability.

3.1 Sealing & Porting

Most of Benoil's Burst Disc assemblies are supplied threaded for installation. We offer a range of threads, but also provide options retainable by screw, circlip, or plain-cylinder options retained in series. A wide variety of options are available in our catalogue, and Benoil also facilitates bespoke requests based on a customer-provided port drawing.

Sealing and porting are determined by the application. Benoil's Burst Disc assemblies have been designed with metal-to-metal seals, carried O-ring seals, chamfered O-ring seals, and other appropriate sealing arrangements. Port dimensions, available wall section, O-ring arrangement, required burst pressure, and required bore dimensions are treated as an interconnected design problem. Benoil Burst Discs leverage over 37 years of experience in ensuring these parameters are accommodated together.

3.2 Foil Material Selection

Originally, Nickel foils were offered but were recognised as unsuitable for some corrosive environments. Inconel 600 plating was explored, due to its greater resistance in sour-gas/hydrogen-sulphide applications. However, plating was found to be less

desirable than a homogeneous and corrosion-resistant foil, as plastic deformation under rupture conditions caused the plated layer to thin and crack.

Subsequently, Hastelloy C-276 was adopted as standard across Benoil's range of Burst Discs, due to its excellent mechanical properties and thermal stability, as well as its superior corrosion-resistance, when compared to a plated foil or other materials. Furthermore, C-276 has excellent welding compatibility with stainless steel, which is used for most Burst Disc assembly bodies.

For low burst pressures, below 1000psi for 5mm style burst discs, Benoil uses stainless steel SS316 and SS304 to achieve the desired burst ratings.

3.3 Body Material Selection

Benoil Burst disc bodies are usually manufactured in SS316, which is a high-performance stainless steel. For applications where corrosion and/or chemical wear have been a critical concern for the client, Benoil has provided Burst Disc assemblies entirely manufactured from Hastelloy C-276.

3.4 Burst Pressure & Tolerance

Benoil's main catalogue of Burst Discs is intended for typical oil and gas well pressures of approximately 1,000psi to 15,000psi. Standard and special values are available within this range. Benoil can supply Burst Discs with pressure capability ranging from 150psi to 25,000psi. For high pressures, different test rigs and pumps are required, together with differing safety precautions and operational considerations.

Benoil discs are generally produced within a tolerance of $\pm 5\%$ for pressure ratings of 2,000psi and above. Below 1,000psi typical tolerance is $\pm 10\%$. Discs can be engineered for tighter tolerances if required, but this requires more extensive batch testing after manufacture.

3.4 Burst Pressure Adjustment for Operating Temperature

All certification tests are performed at ambient temperature, typically about 20°C. The exact value is always declared on the certification sheet supplied with each burst disc.

The burst pressure at ambient temperature will be higher than the burst pressure at operating temperature, if significantly higher. For example, a 5,000psi C-276 burst disc at 20°C room temp, put into a 150°C environment has a correction factor of 0.90 (i.e. a burst pressure of 4,500psi at 150°C). The higher the well temp, the larger the effect on burst rating. Benoil supplies a simple adjustment algorithm for C-276 based on empirical testing, available on request.

Benoil can also provide elevated-temperature testing on request. Customers should provide target operating temperature alongside other design requirements, so we can advise on selection.

4 – Certification & Traceability

Burst testing is carried out on every production batch, via destructive testing of a random sample. Product quality must therefore be achieved principally through consistent manufacturing processes. Manufacturing procedures are established under Benoil's ISO9001:2000 certification.

Typically, five discs are tested per batch, whether the batch contains ten or fifty units. Results are supplied to customers through a Certificate of Test and Conformity, allowing the customer to assess the actual test results.

Benoil's Burst Disc assemblies are engraved with a batch number, burst pressure and foil type to facilitate full traceability. Benoil also maintains traceability internally for our supplied materials and components, which can be provided on request.

5 – Testing

Benoil provides burst disc testing services, treated as customer-specific activities, including:

- High pressure testing
- High temperature testing
- Pressure cycle testing
- Foil fragmentation testing
- Specialty constructed test cells

6 – Other Burst Disc Types

Our standard range of Burst Discs are not necessarily suitable to all operational conditions. Specialist discs have been developed to meet certain non-standard operational criteria.

6.1 Dual-Rating Burst Discs

Dual-rated burst discs feature different rated burst pressures depending on the direction of pressure applied to the disc. This may be to facilitate through-flow if either of two bursting conditions is met. Alternatively, it may be necessary if wellbore fluid has a large temperature differential between internal and annulus. Dual-rated burst discs usually require bespoke designs by Benoil for customers.

6.2 Dual Foil Burst Discs

Dual-foil burst discs consist of two foil elements, separated by an air gap. Such discs may be configured through design to feature a single or dual burst pressure rating. The main reason for a dual-foiled configuration is to mitigate the risk of cyclic-pressure induced fatigue, leading to premature rupture. When a single-foiled disc is repeatedly flipped (i.e. the dome direction changed), the dome boundary undergoes fatigue through gradual work-hardening. The airgap separating the two foils acts as a buffer, preventing either foil from flipping, drastically mitigating the possibility of cyclic-fatigue induced premature rupturing of the disc. Naturally, since two foils are used, it is also possible to configure dual foil discs to also feature a dual burst pressure rating.

6.3 Bespoke Discs

Benoil's catalogue offering of Burst Discs has, in large part, been developed alongside growing and broadening customer demands and applications. As such, Benoil has significant experience in tailoring our Burst Disc assemblies to specific requests in terms of; sealing, threading, port dimensions, burst tolerance, burst pressure, application corrosivity, geometric constraints and non-standard operating conditions or methodologies. Benoil has adapted existing catalogue products, and produced bespoke solutions following a design consultation, to satisfy customer requests.

7 – Standard Range

Benoil's range of Burst Discs varies principally by style (nominal ID) and burst pressure. Our standard range also provides choices of thread, sealing type, fitting type, overall length and other variations on request.

We provide hex head or crosscut (X-cut) options for smaller styles of Burst Disc. For larger styles precluding a reasonably sized Hex fitting, we provide Burst Discs as crosscut only. Our smaller Burst Discs are styled in mm, whilst larger Burst Discs with nominal ID greater than 1" are often denoted in inches. These values are only nominal,

since the true ID of the Burst Disc bore is precisely varied to account for consistent Burst Pressure ratings.

Given the scope of variations in Benoil's extensive range of catalogued Burst Discs, we do not include a tabulated catalogue but instead advise selection via www.benoil.com.

8 – Blank Plugs & Fitting Tools

Blank Plugs and Fitting Tools are sold alongside Benoil's Burst Discs. Blank plugs are available to match each standard Burst Disc configuration, and we can accommodate modifications to Blank Plugs on request. Fitting tool selection depends on Burst Disc style and fitting type. Benoil Burst Disc usually feature either a X-cut or AF hex type fitting, although we have occasionally provided discs with circlip or tri-drive fittings. Standard hex tools are readily available elsewhere. Benoil formerly supplied T-bar style fitting tools, these have been replaced with Hex fitting X-cut stubs, as they allow for torque ratings to be observed using a standard torque wrench.

Index of X-cut Fitting Tools

Burst Disc Style	X-Cut Fitting Tool P/N
5mm	109111
8-11mm	109107
0.75"	109102
22mm	109126
25mm	109109
1.50"	109106
1.875"	109128
2.00"	109115
2.50"	109114
3.00"	109118

9 – Storage and Identification

Benoil Burst Discs have a shelf life of 10 years under normal storage conditions. Burst Disc bodies are engraved with the Benoil P/N and pressure rating. Batch-specific Certificates of Test are included alongside every Burst Disc supplied.

10 – Contact Information

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