

Cement Darts

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Table of Contents

1 – Overview 1

2 – Background 2

3 – Design & Selection 2

4 – Current Range..... 3

5 – Storage and Identification 4

6 – Contact Information 4

1 – Overview

This guide provides product information for Benoil Cement Darts.



2.375” Coiled Tubing x 2000psi BD27mm Cement Dart in Orange

2 – Background

Cement Darts are used downhole to control the discharge of cement in wellbore. The same technique can also be used for other fluids or fluidised solids. Cement Darts consist of a burst disc welded between stainless-steel flanges inside a core which is encapsulated in polyurethane. The polyurethane chevron design seals against the inner surface of wellbore tubing. The Cement Dart core usually features a chamfered nose, to seal against a landing edge or chamfer at the bottom of the string.

The Cement Dart provides mechanical separation between different fluids such as drilling mud, spacer fluids, or cement slurry, to prevent contamination.

When the Cement Dart lands, the string pressure is increased, bursting the internal disc allowing for the flow of fluids or passage of actuation balls through the dart core. Benoil also provides solid-core darts for operations that require simple plugging.

Benoil Cement Darts are used worldwide in well construction, completions, well servicing, interventions, and P&A operations.

3 – Design & Selection

The use of high-grade stainless steel 316 for the dart body, and Hastelloy C276 for the bursting foil, results in a resilient and corrosion-resistant dart, which maintains performance in most well conditions. In applications requiring burst pressures below 1000psi, Benoil uses SS316 or SS304 for the bursting foil.

The polyurethane chevron dart-outer maintains a firm seal within the tubular, whilst wiping the surface of the string during transit, minimising fluid contamination. An additive system is used within the polyurethane that elevates the maximum sustained operating temperature to c. 160°C.

Elevated downhole temperatures will reduce the bursting pressure of the disc, which should be accounted for in Cement Dart selection using Benoil's burst pressure correction algorithm.

Design Scope

Benoil's range of Cement Darts varies by coiled tubing OD, coiled tubing wall thickness, and burst pressure rating. We also offer variations in the cement dart's bore diameter, subject to the geometric constraints imposed by the dart body. This allows for increasing or decreasing through-flow, as well as allowing various sizes of actuation

balls to be passed. Benoil Cement Darts spans coiled tubing sizes from 1.25” to 2.875”, bore diameters of 12mm to 44mm, and commonly provide burst pressure ratings between 500psi and 15000psi.

Our cement darts can accommodate a range of coiled tubing wall thicknesses, achieved by varying the interference fit of the polyurethane chevron over moulding. The interference fit optimises sealing performance and can be selected for tapered coiled tubing strings. In cases requiring a higher differential pressure across the Cement Dart, for example where cement dropout is a concern, Benoil supplies cement darts with a tapered bore.

Bespoke Design

Benoil frequently provides bespoke designs for its products and is committed to accommodating our customers’ application-specific needs. Benoil has occasionally provided Cement Dart style products for use in drill-pipe and other oilfield tubulars.

Operation

Other features have been included for ease of operation and reliability, such as the cone-tail design featured for wide-bore darts, to centre successive darts and to help direct a ball through the Cement Dart’s core.

Benoil Cement Darts require a hard landing ring, in the form of a restriction, but not necessarily a dedicated catcher. Cement Darts feature a 45° chamfered nose to prevent leakage paths at the landing ring, as such it is also advisable that the landing ring features a 90° edge. The polyurethane fins are not sufficiently stiff to land the cement dart.

4 – Current Range

Benoil’s range of Cement Darts varies by principally by coiled tubing size, and thereafter by wall-thickness, burst pressure and bore diameter.

Benoil P/Ns	Product Type
223###	Solid Core Cement Darts
224###	1.250” CT Cement Darts
225###	1.500” CT Cement Darts
226###	1.750” CT Cement Darts
227###	2.000” CT Cement Darts
228###	2.375” CT Cement Darts
229###	2.875” CT Cement Darts

5 – Storage and Identification

Benoil Cement Darts have a shelf life of 3 years under normal storage conditions. Cement Dart bodies are engraved with the batch number and pressure rating.

Cement Darts are often used in series, so the colour of the polyurethane over-moulding is varied according to pressure rating. In order of *increasing pressure rating*, our Cement Darts are supplied with the following colours (not every colour is present in every range):

1. Yellow
2. White
3. Orange
4. Salmon
5. Red
6. Green
7. Blue
8. Violet
9. Black
10. Ginger
11. Brown

6 – Contact Information

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