

## .... C-Sleeve Cement Protection™ Sleeve .....

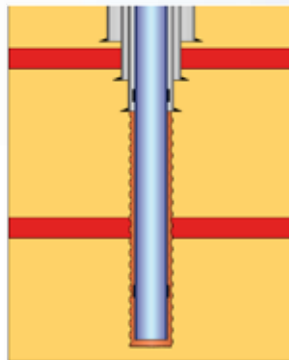
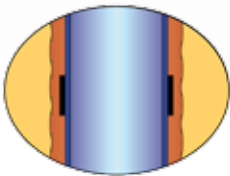
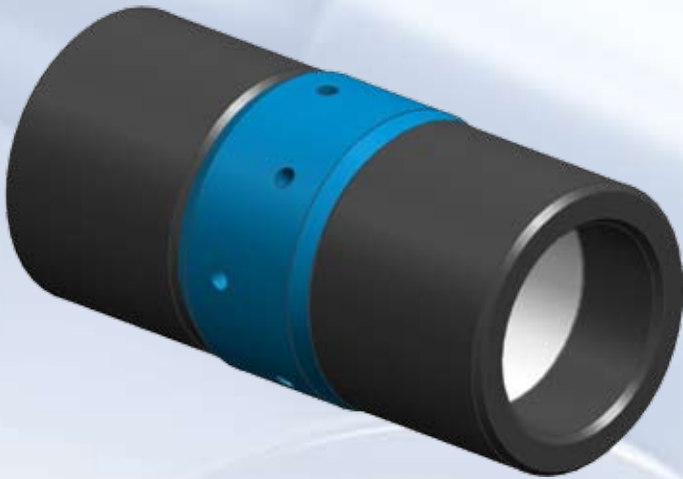
### Overview

The C-Sleeve is as an effective remedy against micro-annuli when run in combination with cement operations

- Swellable rubber on external & internal of sleeve.
- External rubber seals off leaks between base pipe and cement (micro-annulus).
- Internal rubber seals between the base pipe and the sleeve
- Centre OD slightly larger and acts as centralizer
- Rubber elements protected while running in hole and while rotating during cementing

### Features and Benefits

- Provides significant cost savings
- Can remove the need for a cement squeeze
- Available on casing or as a sleeve
- Strong and durable packer
- Simple - there are no moving parts
- No additional site crew
- Long life span
- Seals automatically as flow begins in the micro annulus
- Prevents annular flow



Micro-Annulus Cementation Solution

### Installation Process

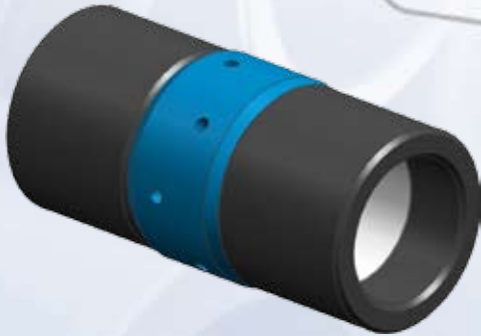
The C-Sleeve swellable elastomer is vulcanized directly onto the sleeve to creating a strong and durable packer. The C-Sleeve is shipped from our manufacturing plants to the well site or customer's warehouse in a ready to run condition. The sleeves are delivered with eccentric grub screws for easy and secure fixture to the base pipe. All that is required for installation is that the rig crew remove the protective covering prior to the C-Sleeve being made up to the casing string.

**simple. efficient. reliable.**

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## Typical Installation Layout



C-Sleeve's are available as an off the shelf sleeve, or bespoke design integrated into the casing. Our sleeves conform to the most commonly found well sizes and conditions in your region and are primarily intended for fast turn-a-round or contingency applications. Typically held on the rig site and run across casing or tubing to prevent flow and hold pressures of up to 6000psi. Using our modelling software, the C-Sleeve can be configured to suit the well application with as many C-Sleeves being run in series as required.

## Typical Sleeve Specification

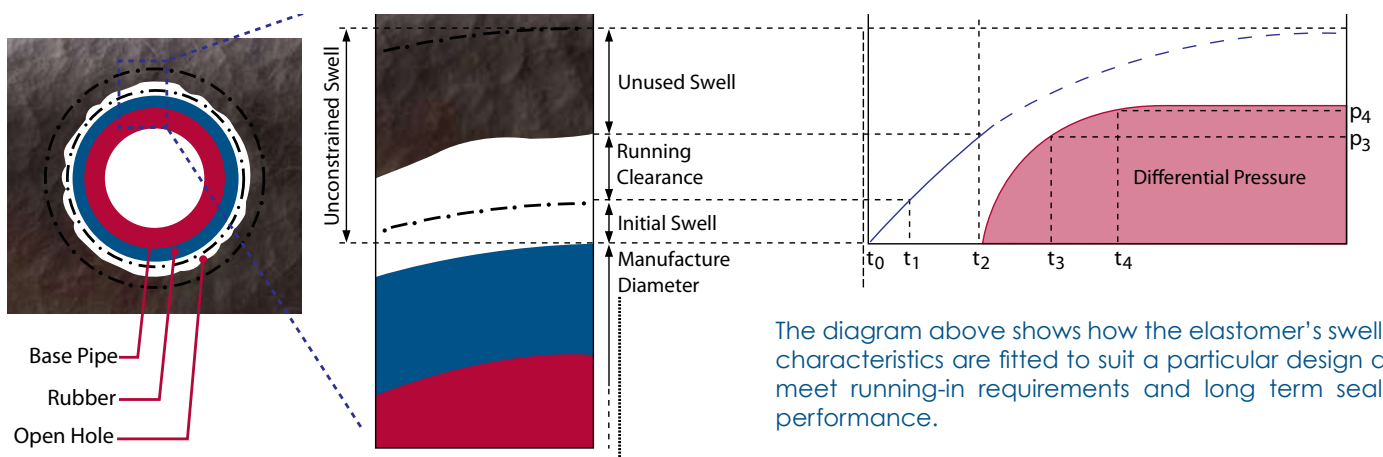
<b>Base Pipe OD (in)</b>	5 1/2" - 20"	<b>Time to set</b>	1 - 20 days
<b>Temperature (oC)</b>	40 - 150*	<b>Operates in Oil</b>	Yes
<b>Salinity (ppm)</b>	0 - 200,000**	<b>Operates in Water</b>	Yes
<b>Elastomer Selection</b>	Water and / or Oil	<b>Base Pipe Material</b>	Any, including most coatings
<b>Sealing Pressure (psi)</b>	200 - 6,000	<b>Standard Lengths</b>	425mm
<b>Running Tools</b>	None	<b>Bespoke Lengths</b>	Yes
<b>Additional Crew</b>	None	<b>Chemically Resistant</b>	Yes
<b>Handling Equipment</b>	As base pipe	<b>Life Span</b>	Life of Well
<b>Training Required</b>	None		

\* not all combinations are available - ask for details

\*\* only water swellable elastomers - ask for further details

Other sleeves are available ask for full details.

## Swell Design Parameters



The diagram above shows how the elastomer's swelling characteristics are fitted to suit a particular design and meet running-in requirements and long term sealing performance.