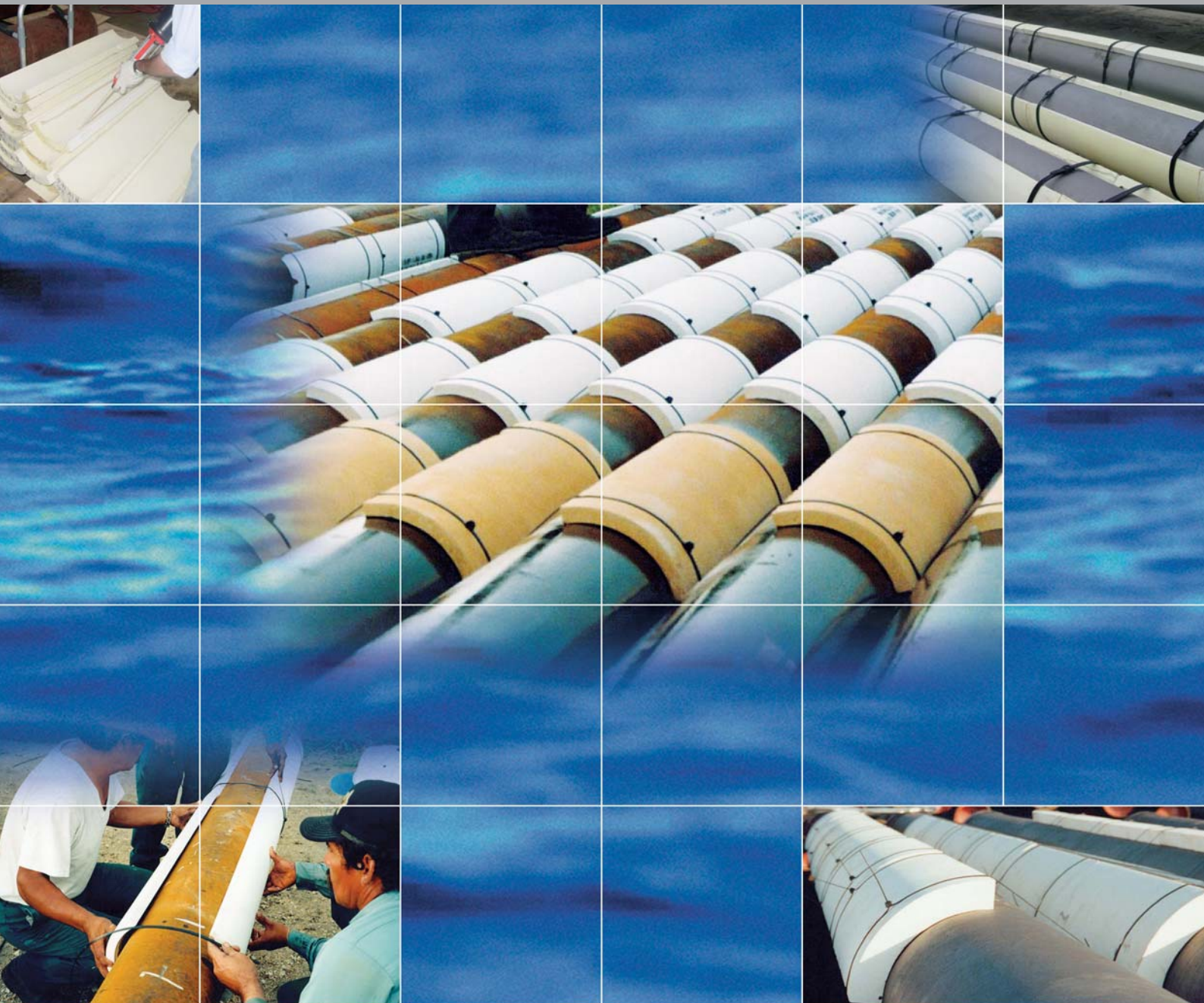


# Crushable Foam Wrap

Engineered Systems



## Product Overview

Trelleborg CRP's Crushable Foam Wrap system (CFW) is offered as a proven engineered solution for the mitigation of potentially dangerous annular pressure build-up (APB) between oil well casing.

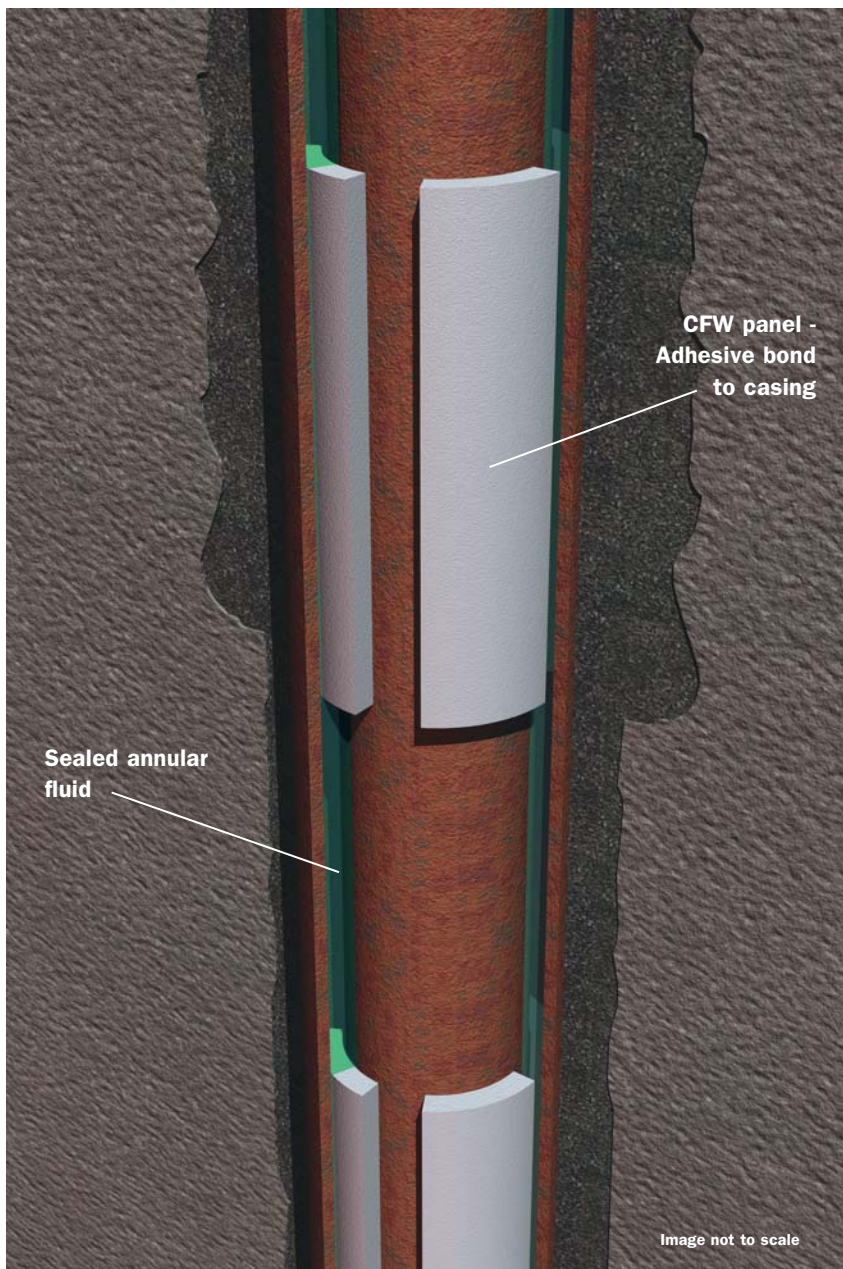
Having supplied CFW as an APB mitigation solution to some of the world's most prestigious deepwater projects since the 1990s – Trelleborg CRP is proven to perform.

If not managed, APB induced loads can compromise well integrity during both drilling and production operations, potentially leading to leaking fluid or catastrophic rupture of inner casing halting production.

When subsea wells are completed, liquid becomes trapped at fairly low temperatures between the outer wall of one casing string and the inner wall of another – in the casing annulus.

Heat from normal drilling and production operations can cause the trapped fluids to expand and potentially create pressures in excess of 10,000psi.

### Simplified Well Section



Texas, USA

The most effective mitigation solution for APB is to allow the fluid trapped within the casing annulus to expand. Trelleborg CRP's CFW is designed to collapse before any potentially dangerous pressure occurs.

CFW is installed onto the casing's outer wall before being immersed within the annulus fluid.

CFW installed projects include:

<b>BP</b>	Machar I, II, III	North Sea
<b>BP</b>	Mad Dog	Gulf of Mexico
<b>Shell</b>	Ram Powell	Gulf of Mexico
<b>Total</b>	Akpo	West Africa

**System Design**

CFW is a polymeric material which has a closed cell foam micro structure. This allows for compression and ultimately collapse of the foam to take place.

The structure of CFW is engineered to fail at two specified pressure-temperature combinations as dictated by the expected well conditions.

CFW is typically manufactured and supplied in metre long quarter cylinders or 'quadrants'. This allows it to be handled and installed with ease and located anywhere within the trapped annulus, while still allowing the free flow of the fluid.

The amount of CFW specified for a project is dictated by the collapse volume and crush percentage requirements within the annulus. The collapse volume is specified by the client and is defined as the calculated volume increase of the annular fluid brought about by thermal expansion between the installation temperature and the operating temperature. The crush percentage is the percentage volume of the syntactic foam that is available for compression to allow expansion of the annulus fluids. This value depends on the particular foam formulation. From the collapse volume and crush percentage a total volume of foam required can be calculated.



**Operation**

In the start-up phase, the materials remain intact, with no significant volume change. As pressure and temperature in the well rise during operations, the materials begin to compress and relieve pressure in the narrow, confined space of the annulus.

If conditions reach certain preset limits the syntactic foam undergoes a progressive and significant collapse, preventing excessive overpressure and thus protecting the steel casing.

**Installation**

CFW can be installed on site and is supplied as a ready to install kit including high performance acrylic adhesive, dispensing systems and information relating to advised installation methods.



Adhesive application



'Quadrant' placement



Temporary banding application



Nigeria, West Africa

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