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# **TECHNICAL REPORT**

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## **BELZONA**

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**BELZONA CERAMIC S-METAL**

**REPORT No. BGN-92-6392**

**VERITEC**

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VERITEC

# Technical Report

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| Approved by<br>J. H. Andersen, Principal engineer <i>Johannes Andersen</i>  |                         |                             |
| Client, Sponsor<br>Jean Anker Øgaard A/S  | Clients ref.<br>BELZONA | Type of Report<br>TECHNICAL |
| Summary<br><br>The report presents the results from testing of Belzona Ceramic S-Metal in simulated formation water conditions. |                         |                             |

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|---|---------------------|----------------------|
| Report No.<br>BGN-92-6392                                 | Subject Group<br>E7 |                      |
| Title of Report<br>BELZONA CERAMIC S-METAL                |                     |                      |
| Work carried out by<br>B. Espelid<br><i>Børge Espelid</i> |                     |                      |
| Work verified by<br><i>Børge Espelid</i>                  |                     |                      |
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#### 4 Indexing terms

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| CORROSION       |
| FORMATION WATER |
| COATING         |
| TESTING         |

#### Distribution statement:

- No distribution without permission from the responsible department/project
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## INTRODUCTION

In connection with a corrosion testing programme performed by Veritec to examine the corrosion behaviour of a linepipe steel in a formation water, the experimental test chamber was coated with Belzona Ceramic S-Metal to minimize the corrosion attack on the substrate C-steel. Consequently, the Ceramic S-Metal was exposed to the same exposure conditions as the linepipe steel, and this report presents the coating behaviour as a result of the exposure to the corrosive formation water systems.

## EXPERIMENTAL PROCEDURE

The Belzona Ceramic S-Metal was applied to the C-steel of two test chambers according to the specifications put forward by the manufacturers, as given in Appendix 1.

The two test chambers were exposed to the following test conditions.

### Electrolyte:

3.5 % NaCl-solution

### Pressure:

5.5 bar

### Gas composition:

0.83 mol % H<sub>2</sub>S  
91.6 mol % CO<sub>2</sub>  
7.6 mol % N<sub>2</sub>

### Test temperature:

50° (Chamber 1)  
Ambient (Chamber 2)

### Test duration:

6 months

Thus, the Belzona Ceramic S-metal was exposed to formation water containing the corrosive gases CO<sub>2</sub> and H<sub>2</sub>S with two different temperatures for six months.

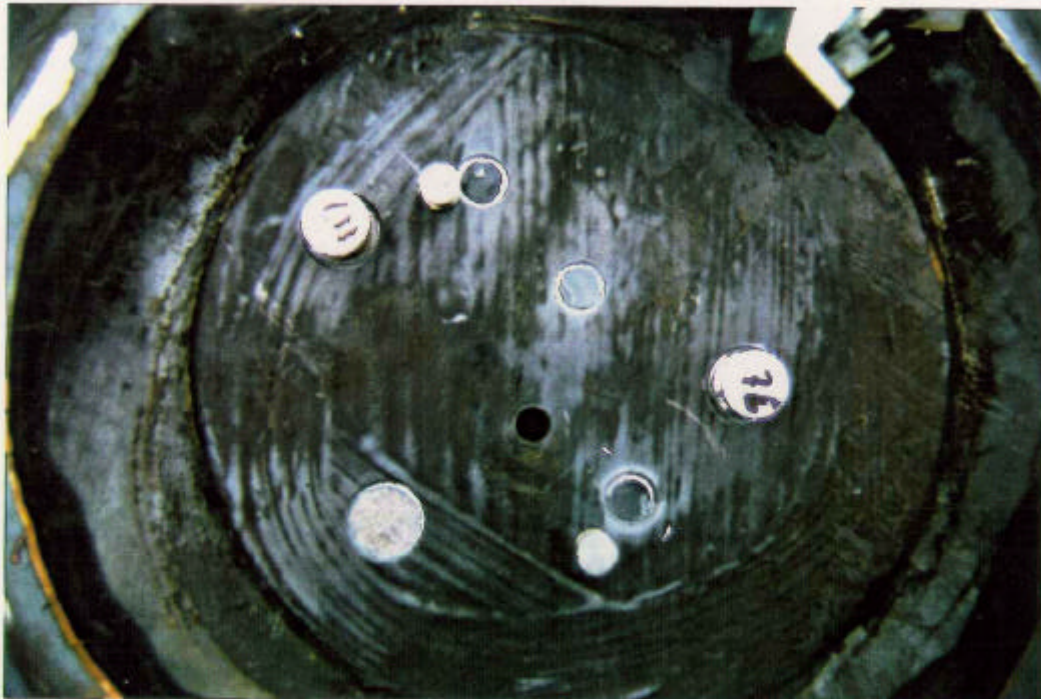
After termination of the exposure test, the condition of the coating was characterized visually and the adhesion to the substrate was verified through dolly testing.



## TEST RESULTS

The visual examination of the coating after the test period confirmed that the coating did not show any tendency to general or local breakdown. No indications of blistering, undercutting or disbonding could be observed, as is evident from Fig. 1.

The adhesion test, Fig. 2, showed that the adhesion properties had not been weakened as a result of the exposure test. Values higher than 7 MPa were recorded. At this stress the dolly broke in the glue between the dolly and the coating.



**Fig. 1.** The general condition of the Belzona Ceramic S-Metal after termination of the testing.



**Fig. 2.** Dolly testing for determination of adhesion strength.