



FOCUS ON FLANGE CORROSION PROTECTION

WHY FOCUS ON FLANGE CORROSION PROTECTION

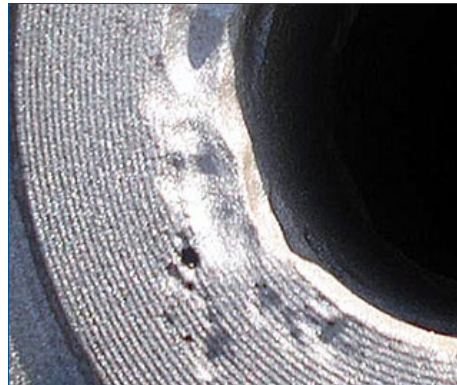
Exposure to corrosive environments or polluted industrial atmospheres can lead to high corrosion rates of unprotected flanges. Due to the complex geometry of a flanged connection, problems such as crevice corrosion are found within the gap between the two flange faces. Also, galvanic corrosion is commonly found where dissimilar metals are used and can cause severe damages to the integrity of the piping system.

Crevice corrosion is a common damage mechanism where there is a concentration of corrosive substances in a localised area. Indeed, the rate of corrosion is accelerated by the concentration of corrosive materials within a confined space. The crevice between two flange faces is the ideal environment for crevice corrosion. The flange face is predominantly prone to crevice corrosion when flanges are used in extremely corrosive environments such as acid or sea water service.

Insufficient external protection can lead to rapid and more extensive damage to the flanges and fastenings which will accelerate the deterioration of the system's integrity. The consequences of such a situation are not easy to predict since they are dependent upon prevailing conditions. Depending on the severity of the



Corrosion damages on flange



Crevice corrosion on flange face

environmental conditions, there may be a slow continuous degradation of the substrate; however, under extreme conditions, the external corrosion process may rapidly reach a point where the structural integrity of the system is adversely affected and could result in a catastrophic loss of containment.

BELZONA 3411: PEELABLE MEMBRANE

To answer flange corrosion issues, on January 2014 Belzona launched to the market a new peelable coating concept specifically designed for the protection of flanges, fastenings and associated pipework to exclude moisture and prevent crevice, galvanic and atmospheric corrosion. This two-product system combines a tough flexible encapsulating topcoat, Belzona 3411 (Encapsulating Membrane), and a corrosion inhibitor, Belzona 8411. The system can be used to protect most flange shapes, sizes and configurations. Belzona 8411 also has release properties allowing the Belzona 3411 topcoat to be peeled back from the joint to allow inspection.

This system is easy to apply, does not require heat or any specialist tools and forms a tough elastic protective barrier when cured. It can be used not just to provide a complete corrosion protection for flanges, fastenings and associated pipes, but also as a preventive system which helps improving and facilitating further monitoring and inspection of flange faces.

In this Belzona Mailing we present two case studies where the Belzona 3411 system was successfully used to provide flange corrosion protection.





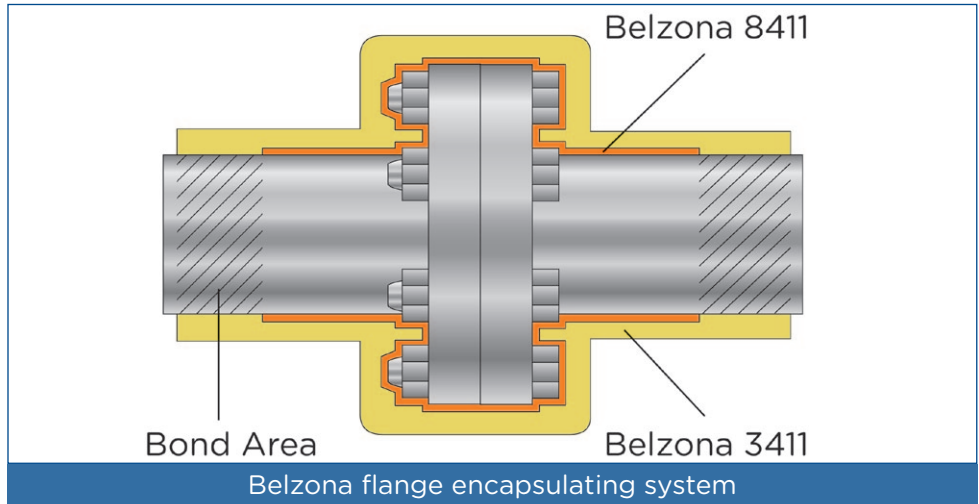
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BELZONA OFFERS ANTICORROSIVE AND PEELABLE PROTECTION FOR FLANGES IN BRAZIL

In January 2015, an independent tank storage provider in Bahia, Brazil, required corrosion protection for flanged joints connecting the pipework. The complex geometry of the flanged joints had caused a number of problems, such as crevice corrosion in the gap between the flange faces and galvanic corrosion, where the use of different metals can lead to serious consequences. In fact, on the 44 flanges recently installed on the site, several flanges had to be completely replaced due to severe corrosion. The flanges are found in a chemical storage company in a loading and unloading port and are therefore exposed to an aggressive and marine environment.

The previous solution was to use a conventional paint. As this method however did not prevent crevice corrosion, the company decided to protect the 44 flanged joints using Belzona 3411 in a gradual process.

The application was carried out in accordance with [Belzona Know-How System Leaflet GSS-11](#). All surfaces to which the Belzona system was to bond were cleaned with Belzona 9111 (Cleaner/Degreaser) to remove all dirt, grease and surface contaminants. The bond areas also required surface preparation to ensure good adhesion. The minimum level of surface preparation for the



system for exposed/corroded steel is wired brushing to ISO 8501-1 St 2/SSPC SP-2.

The gap between flange faces was sealed with a strip of bond breaker tape, whilst masking tape was also applied over the two bond areas to protect these sections of pipe from accidental overspray of Belzona 8411, and hence impaired adhesion.

The system requires the use of Belzona 8411 to achieve the optimum level of corrosion protection and to allow access to bolts and flanges in the event of required maintenance. Belzona 8411 can be simply spray or brush applied onto the flange, pipe and fastenings ensuring the film coverage is even and complete.

Once Belzona 8411 was touch dry, the masking tape was removed and plastic caps fitted over the bolts. Belzona 3411 was applied in two coats, using strips of Belzona 9311 (Reinforcement Sheet) in the circumference and in the extremities of the flanges. Once the application had been completed, a visual inspection was carried out.

The client was thoroughly satisfied with the simple application of Belzona 3411, which offers excellent corrosion resistance and allows for easy access to flange fastenings due to its peelability. The Belzona method has specifically been designed to exclude moisture and prevent crevice, galvanic and atmospheric corrosion, bypassing the need to replace the flanges.



Corroded flange



Application of Belzona 8411



Application of Belzona 3411



FOCUS ON FLANGE CORROSION PROTECTION

BELZONA 3411 SOLVES CORROSION ISSUE FOR A CHEMICAL PLANT IN USA

In June 2014, the Plant Maintenance Manager of a chemical plant in South Louisiana, USA, contacted Belzona following receipt of a Belzona newsletter focusing on the newly launched peelable flange encapsulating system.

The customer had a 52" flange on a vessel connecting to outlet piping that needed corrosion protection. To avoid corrosion between the flange faces, a previous protection solution consisting of fiberglass coverings was used on other vessels in the unit. Fiberglass offers good corrosion resistance but these materials can however be time-consuming and expensive to apply. If access to bolts is required, fiberglass can be cut away, but is difficult to remove and normally must be replaced with a new system to reinstate the protection. In order to avoid these drawbacks, the client was looking for an alternative and more cost-effective protective solution

that allows for a simple installation, is suitable for all flange sizes and shapes, and permits easy access for inspection purposes.

Belzona 3411 was recommended as the system provides a complete corrosion protection for flanges, fastenings and associated pipes and can be easily applied and peeled back for maintenance purposes.

The application was carried out by the plant personnel in accordance with [Belzona Know-How System Leaflet GSS-11](#).

The customer saved several thousand dollars over the previous fiberglass system with easier installation. The unit was inspected 90 days after the installation and it looked as good as it did on day one. The application was revisited in April 2015 and the protection was still in perfect condition. The client was very satisfied with the Belzona solution and is planning to use Belzona 3411 on other flanges in the plant.

KEY BENEFITS OF BELZONA 3411

Excellent corrosion resistance

Achieved via the combination system of Belzona 8411 (a corrosion-inhibiting base layer) and the tough, durable, encapsulating outer layer of Belzona 3411.

Peelable and resealable system

Belzona 3411 can be peeled and resealed, allowing easy access to flange fastenings in the event that disassembly is required.

Simple and quick to use

Belzona 3411 is easy and quick to apply using simple tools, and uses a fast-cure polymer for minimum downtime.

Excellent adhesion onto manually prepared surfaces

Belzona 3411 exhibits excellent adhesion to manually prepared surfaces, for example to ISO 8501-1 St 2 or SSPC SP-2.

Excellent UV and environmental weathering resistance

Belzona 3411 offers excellent UV resistance and withstands the effects of adverse weather conditions.



52" flange prepared for application



First coat of Belzona 3411



Final side view of flange



Perfect condition after 10 months



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MORE APPLICATIONS AND ONGOING PROJECTS

Belzona 3411 Solves Corrosion Problem for a Natural Gas Purification Plant in China

CUSTOMER LOCATION:

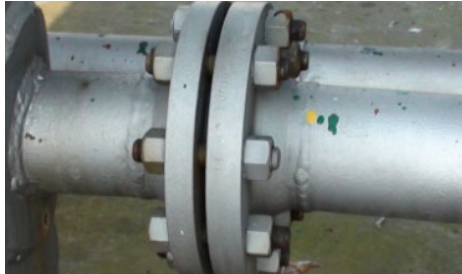
Sichuan Longgang Natural Gas Purification Plant, China

APPLICATION DATE:

November 2014

APPLICATION SITUATION:

Flange on purification equipment



Belzona Solves Leaking Problem on Gas Pipe in Germany

CUSTOMER LOCATION:

Gas Distribution Company, Stuttgart, Germany

APPLICATION DATE:

September 2014

APPLICATION SITUATION:

Flange on natural gas pipe (diameter of the flange 1,30m)

SUBSTRATE:

Steel



ON THE BEL

Application and training

- [Belzona 3411 launch page](#)
- [Know-How System leaflet \(GSS-11\)](#)
- [Application video](#)
- [Product launch webinar recording](#)
- [PSS](#)
- [IFU](#)

Marketing and promotion

- [Product flyer](#)
- [Email banner](#)
- [Belzona 3411 page on Belzona.com](#)
- [Press release: The Flange Protection Challenge](#)

KHIA

- [XXIX, no. 119](#) - Tank Storage Provider
- [XXVIII, no. 198](#) - Chemical Plant
- [XXIX, no. 75](#) - Gas Distribution Company

NEXT MONTH...



Next month's Belzona mailing will focus on facilities maintenance companies and the best way to target them. It will also feature two case studies that demonstrate Belzona's polymeric repair solutions to commonly found problems within this sector.



Please [click here](#) to view the Belzona 3411 application video

