

# Belzona Nozzle Insert and Corrosion Protection for Demin Vessel

ID: 9383

**Industry:** Chemical & Petrochemical  
**Application:** TCC-Tanks and Chemical Containment Areas  
**Substrate:** Carbon steel  
**Products:** Belzona 1311 (Ceramic R-Metal), Belzona 1321 (Ceramic S-Metal), Belzona 1391S, Belzona 1391T, Belzona 1813

**Customer Location:** Petrochemical Facility in South Africa  
**Application Date:** January 2021

## Problem

Several cation exchangers required an internal coating to protect the metal of the shell and distribution plates against corrosion. Various coatings have been trialled over the years and due several coating failures which result in unplanned downtime, the water works management team requested that alternative solutions.

Coating failures in these vessels generally occur around the holes in the nozzle plates. This then leads to sulphuric acid entering past the rubber gaskets between the plastic nozzles and the coated nozzle plate, corroding the inside surface of these holes and resulting in leaks. Furthermore, in the top section of the vessel, there are three splash plates opposite the three inlet nozzles, also with holes, to disperse the incoming flow and reduce the impact onto the nozzle plate.

Due to high flow rates, a liquid coating alone inside the inlet nozzle bores and on the splash plates do not last, resulting in severe erosion-corrosion of the inlet nozzles and splash plates.



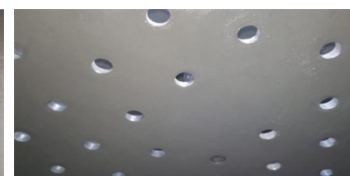
Metal former used to case nozzle inserts



Application in progress of the nozzle inserts



Nozzle bonded in place with Belzona 1311



Completed application

## Application Situation

This vessel was approximately 7metres long and 3metres diameter. There were two divider plates, equally spaced inside the vessel. Each divider plate had 420 holes in the plate to accommodate filters. The distributor oversized the holes by 4mm per side and insert and bonded a Belzona nozzle into place to eliminate the corrosion at these points. The Belzona was first cast into a metal former. After curing, the insert was removed and machined to length. 100 formers were manufactured to cast 100 inserts at a time.

## Application Method

Abrasive blasting to ISO 8501-1 grade Sa 2½ @ minimum 75 microns was implemented before applying inserts and coatings. For the nozzle plates and the 3 splash plates, prefabricated Belzona inserts made from Belzona 1311 and 1391S were recommended for each hole. Depending on hole size, Belzona 1391T or Belzona 1311 were used as an adhesive to bond the insert inside the hole. The

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ISO 9001:2015  
FS 695214  
ISO 14001:2015  
EMS 695213

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inserts protruded 500 microns past the nozzle plate on both sides. The nozzle plates were then overcoated with Belzona 1391S (2 coats) up to and overlapping the inserts. In addition, due to high flow rate, 1813 (3 mm thickness) and Belzona 1391S/T (2 coats) were applied on top of each splash plate, covering the inserts. The 3 inlet nozzles inside the bores required Belzona 1321.

## Belzona Facts

Belzona products were identified for one of the demin vessels to be installed and run over a 6-month trial period. After the successful trial, a total of 840 nozzles were required. The performance of the application is currently in good running condition with a satisfied customer.

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