

BHDT Site Services at Cherepovets in Russia

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Summary

Early 2012, BHDT Service has provided Welding and Installation Services at the new Urea Plant of Cherepovets in Russia.

The Stamicarbon CO₂ stripping PoolReactor urea plant has a design capacity of 1500 mtpd and Engineering and Procurement is performed by Chemoprojekt, Czech Republic. Construction activities are performed by local companies.

The protection alloy in the complete high pressure synthesis section is Safurex® including all High Pressure pipelines and High Pressure control and manual valves.

BHDT realised the completion of all 189 welds within the agreed time and with a 100% failure free score assuring Cherepovets of a Safe and Reliable High Pressure Piping System.

This has increased BHDT's track record to 420 100% failure free Safurex site welds !

Introduction

The trends in project development of large capital projects like new ammonia/urea complexes show that the overall responsibility is shifting from contractors to operating companies.

Also local engineering and local construction companies are becoming stronger, more experienced and more involved in these projects. BHDT has decided to intensify its services business in order to adapt to these trends and deliver more added value to contractors and operating companies.

BHDT Service mission is to:

- Offer Full Life Cycle support for all High Pressure Piping systems
- Learn & Improve via strategic partnerships with operating companies
- Become the One Stop Solution provider for all HP piping issues
- Offer Best Quality and Maximum Reliability

The activities of BHDT Service include all activities related to High Pressure piping systems in a urea plant; from Basic and Detailed Engineering, Installation services, Corrosion Inspections, Troubleshooting, Emergency supply/repair, Spare Parts Management up to Training Programs.

BHDT Site Services at Cherepovetsk in Russia

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Figure 1: Cherepovetsk site in Russia

The Stamicarbon CO₂ stripping PoolReactor urea plant has a design capacity of 1500 mtpd and Engineering and Procurement is performed by Chemoprojekt, Czech Republic. Construction activities are performed by local companies.

The protection alloy in the complete high pressure synthesis section is Safurex® including all High Pressure pipelines and High Pressure control and manual valves.

Safurex® is a super duplex material developed by Sandvik Materials Technology and Stamicarbon and offers several significant advantages above the traditional austenitic stainless steels. For example Safurex® offer a higher mechanical strength so lower schedules (smaller wall thickness) are possible leading to lower costs and lower weight. Furthermore due the smaller wall thickness downscaling is possible as the internal diameter is decisive in choosing the pipeline diameter. Due to its higher hardness figures erosion corrosion is reduced significantly. Safurex® has much better corrosion resistance properties so that condensation corrosion, crevice corrosion and stress corrosion cracking risks are not applicable anymore. Further active corrosion cannot occur with Safurex® materials so less or no oxygen are needed anymore. BHDT has been the first Safurex® HP Valves and HP Piping supplier qualified by Stamicarbon.

Table 1: Scope of welding work

| Material | Inch | Dimension | PCS | Weldingtime per PCS | Total Weldingtime |
|----------|------|-------------|-----|---------------------|-------------------|
| Safurex | 10 | 273,1x15,09 | 43 | 30 | 1290 |
| Safurex | 6 | 168,3x11,7 | 32 | 18 | 576 |
| Safurex | 4 | 114,3x8,55 | 23 | 10 | 230 |
| Safurex | 3 | 88,9x7,62 | 18 | 8 | 144 |
| Safurex | 2 | 60,3x5,5 | 22 | 5 | 110 |
| Safurex | 1,5 | 48,26x5,08 | 1 | 4 | 4 |
| Safurex | 1 | 33,4x4,55 | 29 | 4 | 116 |
| Safurex | ¾ | ES | 13 | 6 | 78 |
| Safurex | ½ | ES | 8 | 6 | 48 |

Table 1 shows the scope of welding work including the expected welding time. Totally 189 welds were to be made requiring an expected welding time of 2595 hours or 12.5 weeks for four welders. The minimum required welding time is determined by the allowable interpass temperatures, however still it has been proven that experienced welders reduce the necessary welding time upto 20%. Moreover experienced welders produce less welds with a failure so significant time and money is saved for corrective actions.

BHDT Service was present with five qualified welders, one fitter and one supervisor. The welders were qualified according Stamicarbon and all local Russian regulations.



Figure 2: Welder Qualification according Stamicarbon and Russian regulations

BHDT has been responsible for the supply, the pre-fabrication at site, the installation (welding of Safurex®) and the quality control.

The scope of supply did consist of HP Pipelines, all HP control valves and HP manual valves and numerous miscellaneous fittings, all Safurex® materials.

The BHDT Site Services started with a Pre-Site visit during which all preparations are made for the real start of the work such as getting acquainted with the safety regulations at site, assuring the availability of all necessary equipment such as all welding machines, tools for the fitters, welding gasses, lifting equipment etc. and agreeing on the local additional manpower for the cutting and beveling activities, rigging and positioning of pre-fabricated spools, support for welders by installation, scaffolding and tent building and ofcourse the Non Destructive Testing according to Stamicarbon specifications.



Figure 3: Finished steel structure



Figure 4: Pre-fabrication workshop

Besides the communication barrier as all communication had to be done via interpreters, the biggest challenge was the ambient conditions of minus 40 degrees Celsius. Welding at these temperatures is obviously impossible so tents with heaters had to be installed to assure the right circumstances to realise a high quality weld.

The real Site Services started in February 2012 with cutting and bevelling the pipes under supervision of BHDT.



Figure 5: Cutting of pipe



Figure 6: Special L-tables of joining and tacking

Before the start of the real welding job all weld edges and pipes were cleaned, exact preparation was performed and the pipes and fittings were joined exactly according the isometrics.

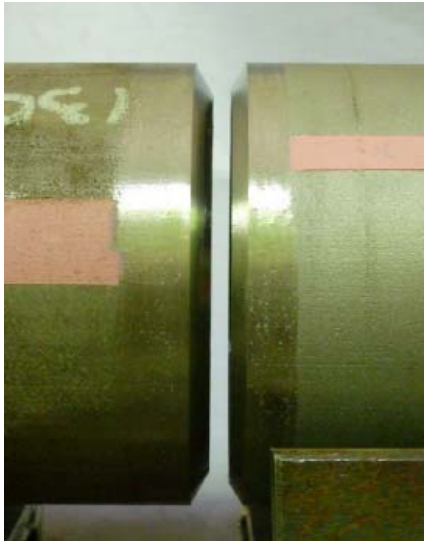


Figure 7: A 6 inch connection



Figure 8: Welding of a 6 inch bend

Next step was the installation of the pre-fabricated spools.

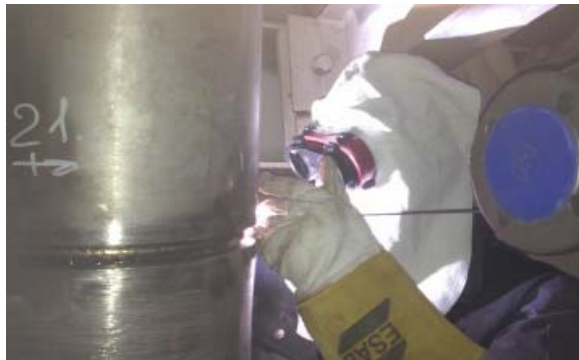


Figure 9, 10, 11: Installation and welding in of Pre-fabricated spools

During and after welding Non Destructive Testing was done according Stamicarbon and Russian regulations: Penetrant Test on welding ends and root, X-Ray of root for larger pipe diameters, Penetrant Test and X-Ray of the final welds.

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Figure 12: BHDT team at Cherepovets in Russia