Product Information

Cost optimization of rolled clad plates for fluegas desulfurization (FDG) plants

Project in common with:

ThyssenKrupp VDM GmbH
voestalpine Grobblech GmbH
FRONIUS INTERNATIONAL GmbH
Kompetenzcenter Streib

Project:

Cost optimization in construction of FDG absorber using plates roll-cladded with alloy 59.

Project duration:

September 2003 bis October 2004

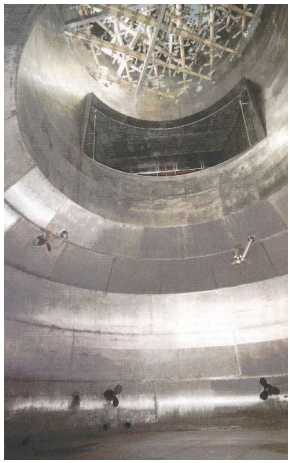
Project objective:

Manufacture, investigation and qualification of roll-bonded clad plates for the purpose of realizing the following cost saving potentials:

Reduction of the cladding thickness of rolled clad plates from 2.0 to 1.5 mm

Limiting the plate thickness tolerances to the total rolled clad plate thickness

Optimization of welding parametres and weld build up



Fabrication of FDG absorber using plates roll-cladded with alloy 59

January2005

Based on the requirements and experiences of the first international and national FDG plants

NICROFER 5923 hMo alloy 59 W.-Nr. 2.4605

was developed by ThyssenKrupp VDM. This alloy has proven its excellence for more than 10 yaers on account of its high resistance against localized corrosion and its thermal stability during welding.
Furthermore it is easy to manufacture plates roll cladded with alloy 59 with a very high quality standard.

For use in FDG installations metallic materials with adequate corrosion resistance meet the following criteria:

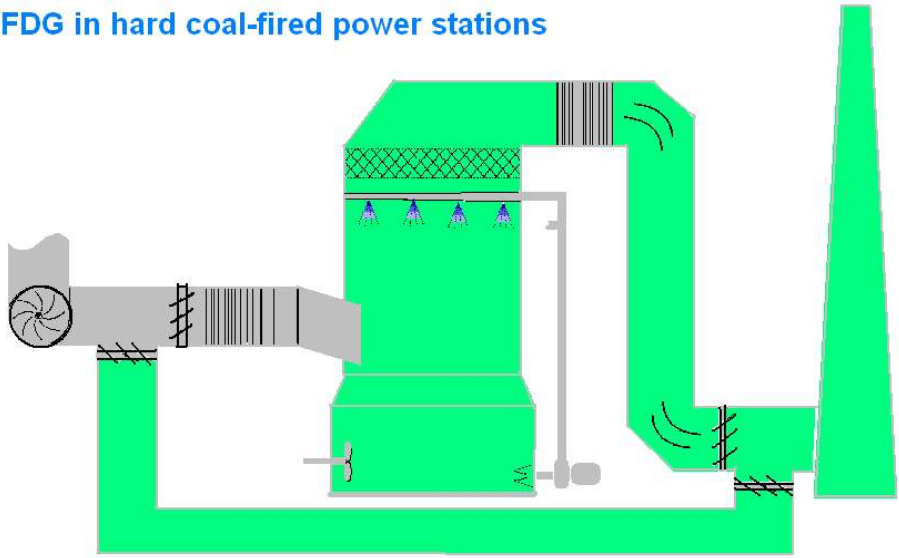
Safe operation, high availability, extended inspection intervals

Low maintenance and operating costs

Capacity to handle load variations, especially during offset conditions

Long service life, very low disposal costs

FDG in hard coal-fired power stations



Green section: Possible areas for use of cost-optimized plates roll-cladded with alloy 59 with a minimum cladding thickness of 1.5 mm. Grey area: Further areas of application to be agreed upon in accordance to the particular plant situation.

In comparison of roll-clad plates with a 2.0 mm minimum cladding thickness, which have been used till now, cost-optimized roll-clad plates with a cladding thickness of 1.5 mm result in a

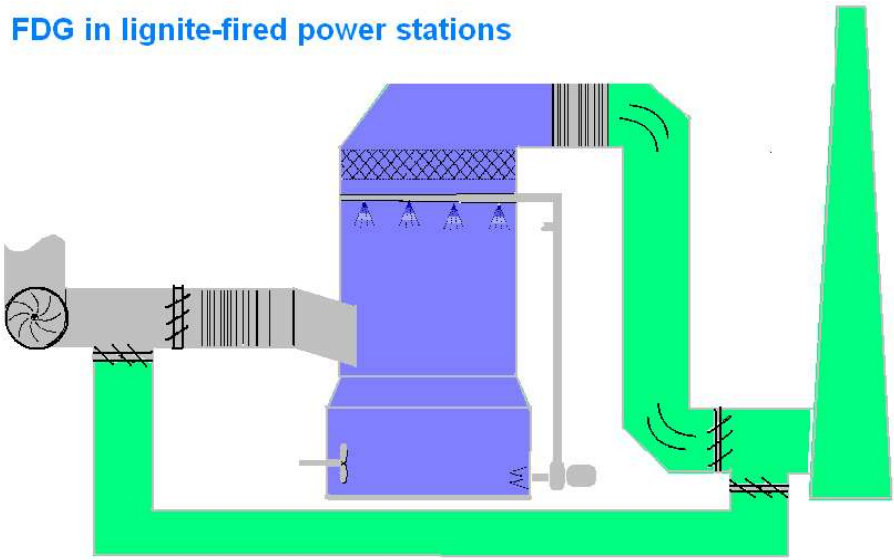
cost advantage of approx. 20 %

even when compared to roll-clad plates with a 1.8 mm minimum cladding thickness the

cost advantage is till approx. 15 %.

For large absorber this results in saving up to **EURO 1.000.000,-** depending on the marerial concept and the construction details.
Added to this are cost saving possibilities by using **optimized welding technology** which significantly reduces the time required for welding.
Rising costs for raw materials represent a further positive aspect for using cost-optimized roll-clad plates:

Roll clad plates are, starting at a thickness under 10 mm, more economical than solid alternatives of special stainless steel grades with 6% Mo usch as alloy 926 (W.-Nr. 1.4529) or alloy 31 (W.-Nr. 1.4562).



Blue section The FDG absorber shells in lignite-fired power stations are to be fabricated using cost-optimized roll-clad plates with a minimum cladding thickness of 1.8 mm.Other areas are manufactured identically to the hard coal-fired power station.

By using cost-optimized roll-clad plates

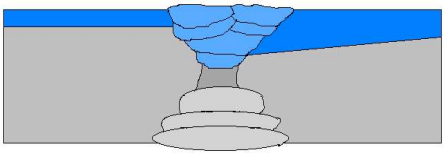
low lifecycle costs

are achieved.

In this **project** roll-clad plates with a cladding thickness of 1.5 mm were produced. Total plate thickness tolerances were maintained during cutting to size.
The cladding thickness along the edge regions of the plates is higher. Various weld configurations were prepared and investigated.

Results:

The iron content in the weld seams was below the required 3.0 % also in the case of roll-clad plates with the reduced cladding thickness of 1.5 mm. Conducted corrosion tests showed similar results to those conducted on plates with thicker claddings. As an alternativ standard welds for strength properties can be made and the corrosion resestance ist obtained bei recladding with cover strips.
The mechanical properties of the weldments are well above the requirements. As the mechanical strength of alloy 59 is significantly above that of the base material, the cladding material can enter into the stress calculation using the same values as for the base material. For this corrosion-resistant material no allowance has to be made for uniform surface corrosion. Uniform loss of material in the absorber, in the ducts and in the stack due to abrasion is unlikely to occur. It should, however, be considered in critical areas during detail engineering for safty reasons.



Left picture: Weld seam configuration with altered thickness tolerances.

Right picture: Welding trials at FRONIUS INTERNATIONAL GmbH using the proven hot wire TIG welding process.

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