

History of corrosion resistant heat exchanger in the industry

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Abstract:

Corrosion resistant heat exchangers have been used for more than 40 years in the industry:

In the 1970s European governments adopted stricter air emission standards that forced operators of fossil power plants to retrofit flue gas desulfurization systems (FGD). To prevent the clean gas ducting and stack from corroding, rotary-type gas/gas heaters (GGH) were installed for reheating the water-saturated flue gas after downstream of the FGD absorber. Since this heat exchanger technology has some disadvantages, e.g. the creation of sour rain, equipment manufacturers began to develop technical alternatives.

In the mid-1980s, first tubular flue gas heat exchangers were introduced by GEA and later also by Balcke-Dürr. These companies operated testing facilities at coal-fired power plants to investigate the corrosion resistance of various tube designs and materials in highly aggressive flue gas environment. Finally, all metal tubes could not withstand the condensing acids in the flue gas, when cooled down below the acid dew point. Only fluoropolymer showed, among other benefits, a suitable corrosion resistance, so that first full-size heat exchangers were built and operated with fluoropolymer tubes.

Nowadays, this heat exchanger technology has been advanced and is used all over the world for utilizing the residual heat of flue gases downstream industrial combustion processes. The heat exchangers are equipped with tubes made of AlWaFlon®, a synthetic material based on PTFE (polytetrafluoroethylene, also known as Teflon®).