

Title (en)
Apparatus for waste heat recovery from exhaust gas

Title (de)
Vorrichtung zur Abgasrückgewinnung

Title (fr)
Appareil pour la récupération de chaleur à partir de fumées.

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EP 2657597 A1 20131030 (EN)

Application
EP 13466004 A 20130308

Priority
CZ 2012165 A 20120308

Abstract (en)

The invention relates to a method for the utilisation of the residual heat of flue gases having a temperature, which exceeds their dew point and containing aggressive constituents, in particular of flue gases discharged from solid fuel fired boilers. The flue gases are blown along the process water causing the thermal energy of the flue gases to be transferred to the process water in order to heat the latter at most up to the boiling temperature of the same under given ambient atmospheric and pressure conditions, the pH value of the process water being adjusted to enable the neutralization of the corrosive action of the condensing flue gas constituents. After the process water is heated up by the flue gases, its heat is transferred to the cooling water. Then, the cooled process water re-enters the flue gas flow in order to extract thermal energy from it. The device for performing the method according to the invention comprises the direct-contact heat exchanger (1) for extracting heat from the flue gases and transferring it to the process water, the direct-contact heat exchanger (1) having a flue-gas inlet, which is connected to the flue-gas outlet of a solid fuel fired boiler and/or to that of an incineration plant producing flue gases that contain aggressive constituents, said flue gases being led through the direct-contact heat exchanger (1). On the opposite end of the direct-contact heat exchanger (1), the water inlet is arranged for contact heat transfer between the flue gases and the process water. The process-water outlet of the direct-contact heat exchanger (1) is connected to the process-water inlet of the second heat exchanger (6) for extracting heat from the process water and transferring it to the cooling water, while the process-water outlet of the second heat exchanger (6) is connected to the process-water inlet of the direct-contact heat exchanger (1). The process-water circuit comprises the inlet for connecting the apparatus (5) for replenishing alkali into the process water in order to maintain the pH value of the process water at a level enabling the corrosive effect of the acids, which are produced during the condensation of flue gases, to be neutralized.

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F22D 1/003 (2013.01); **F22D 1/18** (2013.01)

Citation (search report)

- [X] US 4340572 A 19820720 - BEN-SHMUEL DAN, et al
- [XAI] WO 2010149173 A2 20101229 - DALL ENERGY HOLDING APS [DK], et al
- [XII] US 4491093 A 19850101 - HOEKSTRA I ARTHUR [US]
- [XII] US 4489679 A 19841225 - HOLT FLETCHER O [US]
- [XA] EP 0775873 A1 19970528 - DEUTSCHE FORSCH LUFT RAUMFAHRT [DE]
- [A] US 4660511 A 19870428 - ANDERSON J HILBERT [US]
- [A] WO 9906674 A1 19990211 - NONOX ENG AB [SE], et al

Cited by
CN109539222A; CN113952752A; CN115077281A; CN107631641A; CN108798813A; CN110274491A

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