

Flue systems of stainless steel

Flue systems have to be able to withstand the stresses caused by combustion products. These stresses depend primarily on the type of fuel used and then on the temperature of the flue gases. However, the general rule that higher temperatures lead to greater stresses does not apply here. The opposite is true in the case where low temperatures fall below the dew points of the flue gases. Aggressive components in the form of chlorides or sulphuric acid can then attack the inner walls of the flue and cause long-term damage. Another load factor on the flue system is fluctuating operation times, due to changing seasonal conditions. All of this has to be taken into account when choosing the materials out of which the heating system is made. Stainless steel stands up well to corrosion stresses over a long period of time.

For peak performance a flue system has to reach the correct internal temperature as fast as possible. The heating of the inside of the flue is therefore especially important. Compared to conventional materials stainless steel needs a maximum of only one-twentieth of the thermal energy to reach its optimal operating temperature. As a result, warm-up times are considerably reduced. Stainless steel chimney shafts have the added benefit of smooth surfaces that offer very low flow resistance and prevent the deposition of soot particles.

In the gas central heating system in this apartment block in Kaiserslautern the flue gases are expelled through an external stainless steel chimney. All the apartments also have open fires that are connected to the chimney.



Client: Bovis Lend Lease Limited, Harrow, England
Architects: Allies and Morrison Limited, London, England
Photo: Selkirk Schornsteintechnik GmbH, Waldbröl, Germany

The seven stainless steel chimneys of the energy centre at the BBC's Media Park in White City, London, are attached to a free-standing mast structure and clad with expanded metal.

Clients: Busch, Dujmovic, Ruland, Schanné, Schon, Kaiserslautern, Germany
Architects: AV 1 Architekten, Kaiserslautern, Germany
Photos: Michael Heinrich, Munich, Germany



In condensing boilers in particular stainless steel really shows its advantages. The rapid cooling of flue gases in the condensing boiler means that the temperature is sometimes not high enough to build up sufficient negative pressure in the flue system. The exhaust gases then have to be expelled from the boiler via excess pressure. Such a pressurised system has to be gastight, to prevent any exhaust gases escaping into the building's interior. Stainless steel pipes are not sensitive to moisture and they are gastight, provided that the pipe joints and connecting pieces are properly designed.

Prefabricated systems with double-walled pipe sections are popular for the construction of new flue systems. The individual sections are composed of an outer and an inner wall of stainless steel, with a layer of temperature-resistant insulation sandwiched between. The outer wall, which is less subject to corrosion, is generally made of grade 1.4301 steel, while grades 1.4401, 1.4404 and 1.4571 are preferred for the inner wall.

A double-walled stainless steel flue consists of an outer and an inner pipe, with a continuous layer of temperature-resistant insulation sandwiched between. The stainless steel inner wall prevents capillary penetration of condensates into the structure.

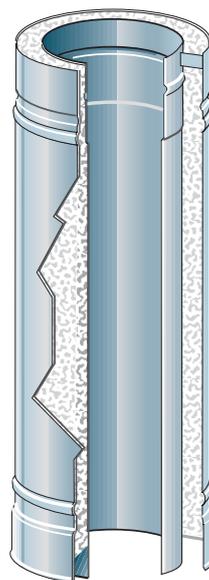


Diagram: Josef Raab GmbH & Cie. KG, Neuwied, Germany

Client: The Lang-Kröll family, Gleissenberg, Germany
 Architect: Florian Nagler Architekten, Munich, Germany
 Photos: Stephan Müller-Naumann, Munich, Germany



The exhaust gases from the wood-fired central heating system in this detached house are expelled through an external, double-walled chimney of stainless steel. The material itself and the high quality of workmanship ensure many years of trouble-free operation.

