During hot metal production as well as in steel works and in foundries emissions arise at very different locations. These emissions must be reliably captured and filtered. Besides intensive filtering, efficiency plays a key role. The emissions must be extracted with as little false air as possible. Moreover, the pressure loss in the duct system must be minimized.

Both the exhaust and the air transport in the duct system of KÜTTNER dedusting plants are systematically optimized in terms of flow technology. This markedly reduces the operating costs of filter plants. The KÜTTNER systems only exhaust air that needs cleaning – clean ambient air is not “unnecessarily” filtered. This improves the capturing efficiency, while maintaining the volumetric flow constant, or it reduces the volumetric flow, while maintaining the same level of cleaning efficiency.

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The service range comprises the planning, design, delivery, assembly as well as commissioning of plants complete with control and data processing systems.

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FLOW OPTIMIZATION: COST REDUCTION

In Hot Metal Production
• Coke making plants
• Rotary plants
• Blast furnaces
• Reduce preparation
• Coal drying/combined drying and grinding
• Cast hoods
• Shaft furnaces

In Steel Works
• Hot metal desulfurization
• Alloying plants
• Converters
• Ladle handling

In Foundries
• Induction furnace plants
• Pouring plants
• Sand preparation
• Modulating plants
• Shaleurat and conveying equipment

Individually Tailored to Specific Conditions on Site
KÜTTNER uses components optimally suited for each specific task. One example is the movable plate for efficient exhaust air capturing being highly superior to conventional hoods.

KÜTTNER also employs suction hoods working on the cyclone principle. Cyclone hoods are particularly suited for capturing robust exhaust emissions, such as hot thermal convection flow at the blast furnace top hoods above the coke layer. The boundary-sheared cyclone thread forming inside the hoods covers uniform pressure distribution, enabling the hood to capture the exhaust air very smoothly also over larger distances.

During the various phases of blast furnace operation, for example, the preparation, dilution and plugging, emissions arise at the tap holes, the coke and the casting. These emissions must be reliably captured and then treated. They mainly consist of particulate products from the chemical reaction between the raw material and the oxygen in the blast furnace atmosphere.

The large size of the blast furnace, with its top holes, battey exhaust heat to the environment, forming a stable convection flow above the pouring stream. At this location KÜTTNER employs cyclone hoods which have proved to be particularly suitable for capturing convective flows. They are arranged outside the swaying range of the diluting and plugging machines. As a result and the trailing closed hoods are used.

The flow-technological optimization of all components ensures that the released emissions are securely captured and extraction of fumes is ensured. Also the exhaust flows is minimal. The exhaust ducts at the individual emission points are equipped with air control dampers. They are integrated into the process flow enabling the setting of optimal suction conditions in any operating situation.

Also the exhausting ducts, which convey the dust-laden air to the fans, are investigated and designed according to flow-technological aspects. This makes for low pressure losses in the duct system and reduces energy requirements.

The fans are made up of a preseparator, which removes coarse dust fractions, and a filter with filter bags that removes the fines. Exhaust air convey the cleaned exhaust air through the clean gas duct, a silencer and a stack, which releases it into the open air. Due to the low pressure losses in the overall system the fans can be downsized compared to conventional systems.

In the duct the stream flow and the dust content of the clean gas are continuously measured. In this way it is possible to check at any time whether the emission values are within regulatory limits.

CAST HOUSE: ONLY CONTAMINATED AIR IS CLEANED

In the internal steel works, which includes from the completion of the converter. The arising flue gases are captured by means of several hoods the gases are mixed and conveyed to the filter plant through the duct system.

The flue gases have an average temperature of about 900 °C, with peak temperatures of about 1,000 °C. By simultaneously extracting the flue gases by several hoods the gases on mixed and cooled down at the duct walls to some 430 °C. In a heat accumulator cool the exhausted fume gases down to the flue gas temperature. The accumulated heat is stored in steel plates and released back to the ambient air within 20 minutes from the completion of the converter charging operation. The ambient air is then cooled down at the duct walls to some 430 °C.

The fine particles are retained in the bag filters. The coarse dust fractions are separated from the extracted fume gases already in the preseparator, to the greatest possible extent by exhaust nozzles.

Steel, Duisburg ThyssenKrupp

When the hot metal is poured into the converter, a great number of different emissions are released. The scrap charge eight contains combustible constituents such as metal chips, oil, greases, tar, gas and oil. Upon addition of the hot metal these substances immediately decompose (pyrolysis) mostly forming into gases and droplets (hydrocarbons), mainly hydrogen, water, ammonia, nitrogen and sulfur gases.

In the converter the incoming fume gases are captured by means of several hoods the gases are mixed and conveyed to the filter plant through the duct system.

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Steel, Duisburg ThyssenKrupp
FLOW OPTIMIZATION: COST REDUCTION

In Hot Metal Production
- Coke making plants
- Sinter plants
- Blast furnaces
- Reduction preparation
- Cool drying combined drying and grinding
- Cast hoods
- Shaft hoods

In Steel Works
- Hot metal desulfurization
- Allaying plants
- Converters
- Ladle handling

In Foundries
- Induction furnace plants
- Pouring plants
- Sand preparation
- Modelling plants
- Shake-out and conveying equipment

Individually Tailored to Specific Conditions on Site
KÜTTNER uses components optimally suited for each specific task. One example is the nozzle plate for efficient exhaust air capturing being highly superior to conventional hoods.

KÜTTNER also employs nozzle hoods working on the cyclone principle. Cyclone hoods can particularly suit capturing volatile and abrasive emissions, such as the thermal conductor flow of the blast furnace top hoods above the coke oven.

The brand-new cyclone thread forming inside the hoods ensures uniform pressure distribution, enabling the blast to capture the exhaust air very smoothly also over larger distances.

CAST HOUSE: ONLY CONTAMINATED AIR IS CLEANED

During the various phases of blast furnace operation, for example tapioca, repulsive dust and plugging emissions around the tap hole, the so-called dust flying over. These emissions may be visibly captured and filtered. They mainly consist of particulate products from the chemical reaction between the blast furnace bed and the oxygen in the sintered and cooled coke fraction admitted from the mill.

In the large sector of the hot metal, the top hole releases large amounts of heat to the environment, forming a stable cone of exhaust air above the running stream. In this location, KÜTTNER employs cyclone hoods which proved to be particularly suitable in regard to their fast separation flows. They are arranged outside the swivelling range of the tilting and plugging machines. The interior and the topping and cooling hooded closed hoods are used.

The flow-technological optimization of all components ensures that the released emissions are separated and retrieved from the exhaust air. It is also of utmost importance that the effect of the endless flow is minimal. The exhaust ducts of the individual emission points are equipped with air control dampers. They are integrated into the process flow enabling the setting of optimal emission points.

The accumulated heat is stored in steel plates and cycloscopic water cooling through the duct system.

While the hot metal is poured into the converter, a great number of different emissions are released. The scrap charger eight contains combustible constituents such as residual parts of steel, oil, gases, tar, coal dust and others. Upon addition of the hot metal, these substances immediately decompose (pyrolysis), mainly forming into gaseous hydrocarbons (CH4 and other compounds), carbon monoxide and hydrogen.

This metallic dust, for example coke, may vaporize and enter into the converter. Water quantity on the scoops may disperse and release hydrogen.

These constituents cause metal and partly carbon dioxide in the converter. The resulting gases are captured and fed into the gas-cleaning process. The gas cleaning process reduces the potential for oxidation by extracting the fume gases already in the pre-separator.

The coarse dust fractions are separated from the extracted fume gases already in the pre-separator. The fine fractions are conveyed to the filter plant through the duct system.

From the filter bags the cleaned exhaust air is conveyed to the clean gas duct, from there via exhaust air ducts into the silencer and stack, which releases it into the open air. Due to the low pressure losses in the overall system the fans can be downsized compared to conventional systems.

In the stack the volumetric flow and the dust content of the fume gases down to the filter inlet temperature. The accumulated heat is stored in steel plates and cycloscopic water cooling through the duct system.
FLOW OPTIMIZATION: COST REDUCTION

In Hot Metal Production
- Coke making plants
- Reheat plants
- Blast furnaces
- Boiler preparation
- Coal drying/combined drying and grinding
- Main runner
- Shaft furnaces

In Steel Works
- Hot metal desulfurisation
- Alloying plants
- Converters
- Ladle handling

In Foundries
- Induction furnace plants
- Pouring plants
- Sand preparation
- moulding plants
- Shale-wheel and conveying equipment

Individually Tailored to Specific Conditions on Site
KÜTTNER uses components optimally suited for each specific task. One example is the nozzles plate for efficient exhaust air capturing by being highly superior to conventional hoods.
KÜTTNER also employs suction hoods working on the cyclone principle. Cyclone hoods are particularly suited for capturing reactive/impulsive emission currents, such as the thermal convector flow, at the blast furnace top side above the main runner. The hand-shaped cyclone thread forming inside the hoods ensures uniform pressure distribution, enabling the blast to capture the exhaust air very smoothly also over larger distances. During the various phases of blast furnace operation, for example tippping, nipple drift/droping and plugging operations, one of the top sides, the actual tip and the flap cover. These emissions must be reliably captured and filtered. They mainly consist of particulate products from the chemical reactions between the flue gas and the residue in the stack and the slag that has been formed.
The large section of the hot gas from the top sides release rapidly intense heat to the environment, forming a stable convection flow above the pouring stream. At this location, KÜTTNER employs cyclone hoods which have proved to be particularly suitable for impulsive convection flows. They are arranged outside the swivelling range of the boring and plugging machines. The interior and the flanger closed hoods are used.
The flow-technological optimisation of all components ensures that released emissions are securely captured and extraction of fume is maximised. Also the effect of convective flows is minimised. The exhaust ducts of the individual emission points are equipped with sw control dampers. They are integrated into the process flow enabling the setting of optimal suction conditions in any operating situation.

CAST HOUSE: ONLY CONTAMINATED AIR IS CLEANED

After the exhausting ducts, which convey the dust laden air to the filters, are arranged and designed according to flow-technological aspects. This makes for low pressure losses in the duct system and lowers energy requirements.
The filter system is made up of a pre-separator, which removes coarse dust fractions, and a filter with filter bags that removes the fines. Exhaust air convey the cleaned exhaust air through the clean gas duct, a silencer and a stack, which releases it into the open air. Due to the low pressure losses in the overall system the fans can be downsized compared to conventional systems.
In the stack the volumetric flow and the dust content of the clean gas are continuously measured. In this way it is possible to check at any time whether the emission values are within regulatory limits.

CONVERTER: COOLING WITHOUT MEDIA

When the hot metal is passed into the converter, a great number of different reactions are released. The scrap charge might contain combustible components such as residues of plastics, oil, greases, tar or others. Upon addition of the hot metal these substances immediately decompose (pyrolysis), forming two or more gas streams. These are mainly: hydrogen, water or quench water, and hydrocarbons.
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During hot metal production as well as in steel works and in foundries emissions arise at very different locations. These emissions must be reliably captured and filtered. Besides intensive filtering, efficiency plays a key role. The emissions must be extracted with as little false air as possible. Moreover, the pressure loss in the duct system must be minimized. Both the exhaust and the air transport in the duct system of KÜTTNER dedusting plants are systematically optimized in terms of flow technology. This markedly reduces the operating costs of filter plants. The KÜTTNER systems only exhaust air that needs cleaning – clean ambient air is not “unnecessarily” filtered. This improves the capturing efficiency, while maintaining the volumetric flow constant, or it reduces the volumetric flow, while maintaining the same level of cleaning efficiency.

OPTIMIZED EXTRACTION OF EMISSIONS ACHIEVES COST ADVANTAGES

KÜTTNER GMBH & CO. KG

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DEDUSTING SYSTEMS
for Blast Furnaces and Steel Works

Efficient Exhaust Gas Extraction
Reduction of Filter Costs
Energy Savings
Eco-Friendly Operation

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