Cooling hot bulk materials with indirect rotary drum coolers

Rotary drum cooler type KTR

for the medium temperature range

In the rotary drum cooler type KTR, the cooling air is channelled through a large number of tubes with a small diameter, whilst the powdery solid material to be cooled trickles in between the tubes as a result of the rotation of the machine. At the same time, the material moves from the cold material inlet in the direction of the outlet due to the inclination of the drum. The large number of cooling tubes means that a very large heat exchange surface area is available, which explains why the KTR rotary drum cooler can also be used very effectively for cooling hot products in the medium temperature range up to approx. 250 or 300 °C.

Frequent applications for this type of cooler involve cooling gypsum or processing ground slag in the cement industry.

Your benefits

Indirectly operating Allgaier rotary drum coolers offer a range of benefits for your production process:

- Heat recovery from the hot solid material
- Saving primary energy and fuel
- Short pay-back time for the investment
- Dust-free waste air from the cooler for use in other process stages
- Avoidance of waste air filter systems

Allgaier supplies indirect tube bundle heat exchangers for cooling hot and very hot bulk materials in various temperature ranges. In high-temperature applications, the solid material to be cooled moves within the tubes and the air is channelled around the tubes. In applications in the medium temperature range, however, the solid material trickles around the tubes which are cooled by means of air.

Both cooler solutions permit heat to be recovered from the hot products and, due to the indirect heat transfer without contact between the air and the solid material, they do not require any filter systems for the hot air from the cooler. They reduce production costs because of heat recovery, at the same time as offering short pay-back times.

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Cooling hot and very hot bulk materials with indirect rotary drum coolers

The application

Many bulk materials such as powdered or granulated products have to be cooled before further processing, either due to the limited • temperature resistance of the follow-on equipment or the • solids and packaging containers or for • heat recovery from the hot product. The hot products can be cooled convectively by contact with air (or other process gases, e.g. nitrogen). In this process, the cooling air flows around or through the products in direct contact. The fine solid constituents that are carried along with the products have to be cooled before they can be discharged. The hot products can be cooled convectively by contact with air (or other process gases, e.g. nitrogen). In this process, the cooling air flows around or through the products in direct contact. The fine solid constituents that are carried along with the products have to be cooled before they can be discharged.

Indirect coolers offer the following possible advantages:

• No need for filter systems for subsequent treatment of the hot air from the cooler
• Counterflow of the cooling air even with very fine products, associated with a very effective treatment of the hot air from the cooler
• Separation of the solid material from the cooling air, which makes an inert operating mode of the cooler possible

The heat recovery makes an important contribution to sustainable economic activity and to protecting the environment. Natural resource consumption is reduced, and production costs are cut due to energy savings. Allgaier offers two variants of indirect rotary drum coolers for hot and very hot bulk materials.

In this case, the hot solid material is moved on one side of a separating apparatus, while the air cools the wall from the other side and consequently does not come into direct contact with the bulk material. Indirect coolers offer the following possible advantages:

• To return the transformed solid materials,
• To meet air purity requirements, or
• To process the hot waste air for use in other processes, or
• To recover the transported solid materials,

The fine solid constituents that are carried along with the products have to be cooled before they can be discharged.

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Cooling hot and very hot bulk materials with indirect rotary drum coolers

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Many bulk materials such as powdery or granulated products have to be cooled before further processing, either due to the limited
• temperature resistance of the follow-on equipment or the
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The first products can be cooled correctly by contact with air (or other process gases, e.g.
• Silos and packaging containers or for
• temperature resistance of the follow-on processes steps, or
• to return it to the cooler.

Indirect cooling represents one very effective alternative for direct product cooling with air. In this case, the hot solid material is moved on
• on one side of a separating apparatus wall, while the air cools the wall from the other side and consequently does not come into direct contact with the bulk material. Indirect coolers offer the following possible advantages:
• no need for filter systems for subsequent treatment of the hot air from the cooler
• Containment of the cooling air even with very fine products, associated with a very effective heat transfer
• Separation of the solid material from the cooling air, which makes an inert operating mode of the cooler possible

The heat recovery makes an important contribution to sustainable economic activity and to protecting the environment. Natural resource consumption is reduced, and production costs are cut due to energy savings.

Allgaier offers two variants of indirect rotary drum coolers for hot and very hot bulk materials:

The type KTR rotary drum cooler is chiefly used for cooling hot, powder products in the medium temperature range up to 300°C, which frequently occur when processing gypsum or ground slag. The solid materials are cooled down to temperatures of 80°C, for example.

The type RKT rotary drum cooler is suitable for high-temperature applications
• Where the hot solid material is heated by the process, e.g. in the range from 150°C to 250°C, and is free from dust. It can be ideally used as preheated combustion air for the burners of the rotary kiln, for drying damp materials or for other processing purposes. This means significant amounts of fuel are saved, and costs are reduced.

The high rates of heat recovery, at 200 kWh/tonne of cooled solid material, there is a very short payback time for the investment – which can be less than once year in some cases.

What is more, the RKT cooler is extremely robustly built in order to meet the exacting requirements on process reliability and service life.

A particularly interesting application for the RKT high-temperature cooler involves installing it following a rotary kiln for cooling titanium dioxide and using hot waste air from the cooler for preliminary drying of the moist filter cake in the vibration fluidised bed dryer. What is more, the RKT cooler is extremely robustly built in order to meet the exacting requirements on process reliability and service life.

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Sample application for an indirect rotary drum cooler

Gas...
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Frequent applications for this type of cooler involve cooling gypsum or processing ground slag in the cement industry.

**Your benefits**

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- Heat recovery from the hot solid material
- Saving primary energy and fuel
- Short pay-back time for the investment
- Dust-free waste air from the cooler for use in other process stages
- Avoidance of waste air filter systems

Allgaier supplies indirect tube bundle heat exchangers for cooling hot and very hot bulk materials in various temperature ranges. In high-temperature applications, the solid material to be cooled moves within the tubes and the air is channelled around the tubes. In applications in the medium temperature range, however, the solid material trickles around the tubes which are cooled by means of air.

Both cooler solutions permit heat to be recovered from the hot products and, due to the indirect heat transfer without contact between the air and the solid material, they do not require any filter systems for the hot air from the cooler. They reduce production costs because of heat recovery, at the same time as offering short pay-back times.

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- Original quality spare and wear parts
- Upgrading, conversion, retrofitting and maintenance of existing drying systems
- Process control advice
- Power and energy advice
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