

AMMANN



AMMANN RECYCLING TECHNOLOGY

CREATING VALUE
THROUGH RE-USE



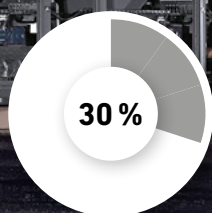
CUSTOM-MADE RECYCLING SOLUTIONS

The use of reclaimed asphalt, or recycling, has become a necessity. Governments increasingly want the reclaimed asphalt from old roads re-used in an effort to be more environmentally friendly. Recycled asphalt (RA or RAP) also can provide you with cost savings on several fronts.

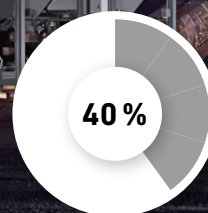
Ammann provides several options to help your recycling and cost-saving efforts. Regardless of the system you choose, modern Ammann plant technology will provide a quality recycling process and product.

Highlights

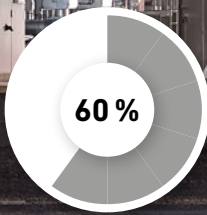
- Significant reduction of production costs due to lower costs of bitumen, minerals and transport costs
- Supported or promoted by statutory legislation (country specific)
- Less effect on natural resources (fewer oil and mineral requirements)
- Reduction of expensive storage facilities
- CO₂ reductions



**RAC SOLUTION
UP TO 30 % RAP ADDITION**



**RAH50 MIDDEL-RING DRUM
UP TO 40 % RAP ADDITION**



**RAH60 RECYCLING DRUM
UP TO 60 % RAP ADDITION**



**RAH100 RECYCLING DRUM
UP TO 100 % RAP ADDITION**

RAC COLD RECYCLING

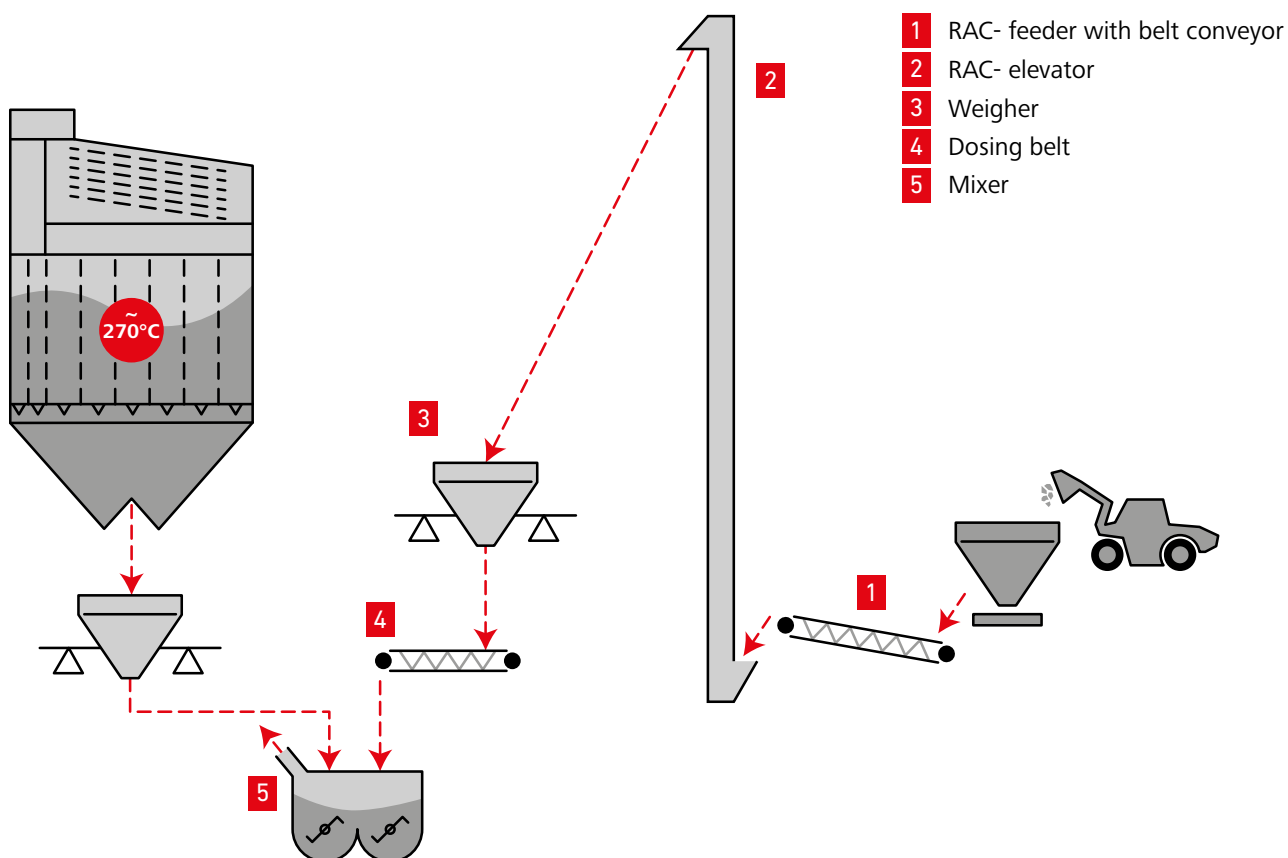
UP TO 30% RECYCLED MATERIAL MIX

RAP can be added cold into the mixer at up to 40 per cent. If cold RAP (RAC) is fed to the plant, the aggregate temperatures must be increased to supply the energy to heat the RAC and to evaporate its moisture content. Vapour generated in the mixer must be evacuated. This is accomplished with a steam evacuation pipe that runs into the raw gas channel ahead of the bag filter.

Evacuation pipes must be vented to avoid vapour condensation and condensate from flowing into the mixer.

Highlights

- Enable the use of 25% to 40% RAP, though mix can still be created with no RAP if desired
- Provide significant cost savings – inexpensive RAP replaces pricy aggregate and bitumen
- Are easy to install, with minimal downtime of the current plant
- Utilise a unique system that doses RAP and aggregates separately to minimise fuel usage and ensure high-quality mix
- Reduce CO₂ emissions
- Require little maintenance





RAH50 MIDDLE RING DRUM

UP TO 40% RECYCLED MATERIAL MIX

RAH50 system allows to process up to 40% of RAP into the virgin aggregate dryer. This technology allows to avoid bitumen aging, sticking and emission problems.

When the surface temperature of the RAP reaches levels over 200-250 C° the evaporation process of the volatile content of the bitumen starts and this means a deterioration of the bitumen properties.

A special system, covered by three worldwide patents is designed to keep the RAP temperature below 230 C°, RAP is never exposed to the flame neither directly nor to its radiation effect.

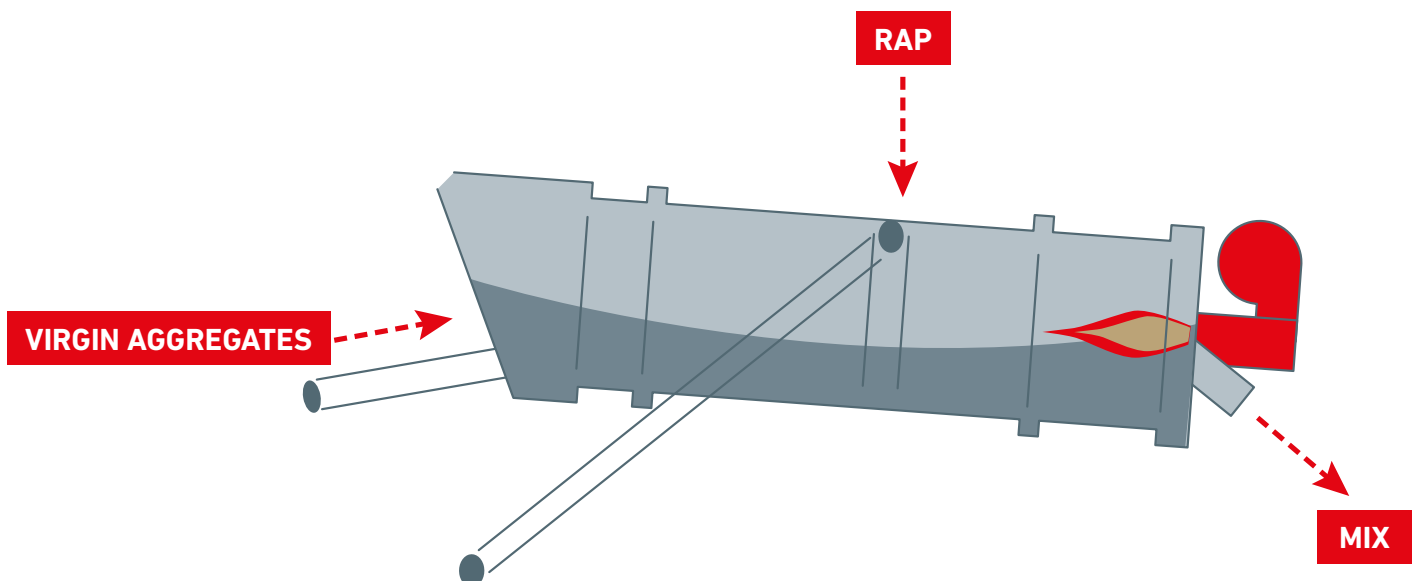
The RAH50 is a counter flow dryer. Virgin aggregate (VA) enters opposite of the burner and they are dried and heated in the convection zone. RAP inlet is done with a middle ring addition equipped with a series of channels.

There channels are made by a special design in order to have the right speed of RAP injection. In this section the RAP is mixed with the heated VA that transfers the heat to the RAP in a gentle way by conductive heat transfer.

The mix VA and RAP is now introduced into the annular chamber. This chamber is designed in order to keep the mix rotating and to protect the VA and RAP mix from the flame. The chamber is designed in order to keep emissions on a low level.

Highlights

- 40 % RAP utilisation achievable
- Easy to retrofit on most plants produced by Ammann or other manufacturers
- Can be combined with cold RAP system for greater flexibility during plant operation
- High Recycling addition rates with low-cost installation





RAH60 RECYCLING SYSTEM

UP TO 60% RECYCLED MATERIAL MIX

RAH60 systems utilise parallel-flow dryers to allow production of mixes with up to 60 per cent cold RAP (RAC). The cold RAP passes the flame, and the bitumen film is not overheated because it is protected by evaporating moisture.

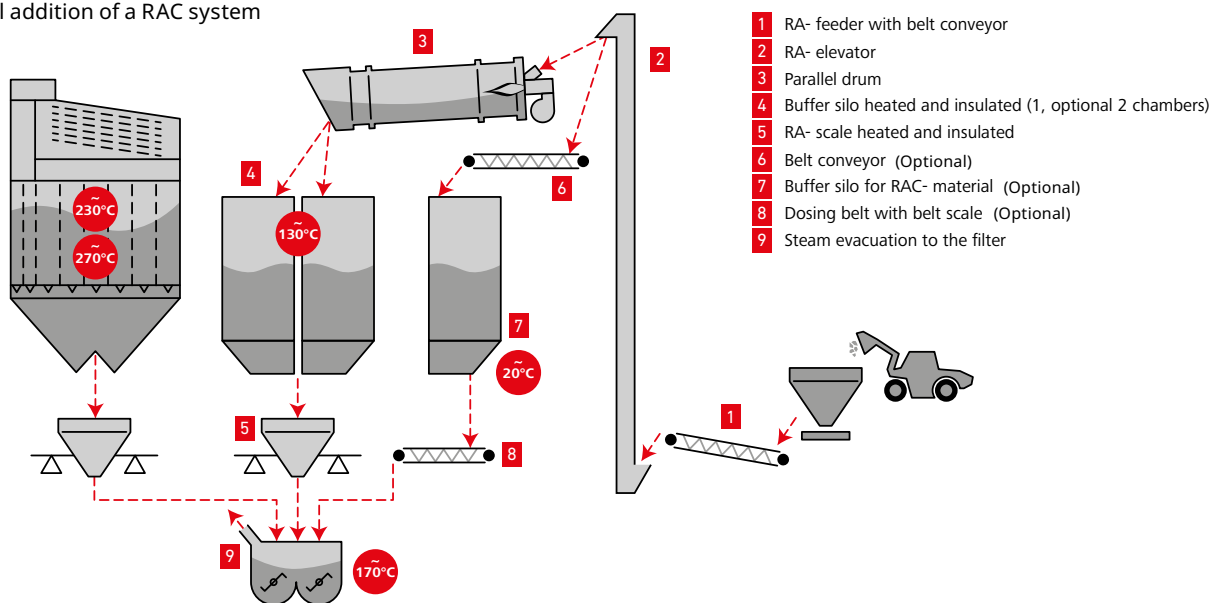
Therefore, RAP with not less than 2 per cent moisture should be used. Heating is limited to 120° C to 130° C for two reasons:

- The bitumen film will not be overheated and damaged.
- Evaporation of hydrocarbons is kept low to meet emission limits.

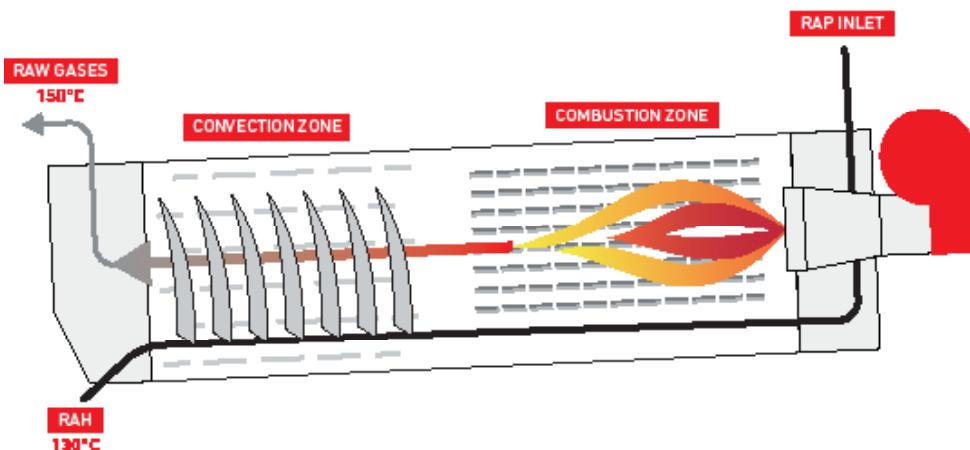
HIGHLIGHTS

- Integrates expertise gained from countless plant operations around the world
- Can utilise up to 60 % hot recycled material
- High feed ratio
- Gentle heating
- Works in combination with the cold feed system for more flexibility and higher amount of RAP addition

Flow chart of the RAH60
with the optional addition of a RAC system



Parallel flow



■ ■ INTEGRATES EXPERTISE
GAINED FROM COUNTLESS
PLANT OPERATIONS
AROUND THE WORLD ■ ■



RAH100 RECYCLING SYSTEM

UP TO 100% RECYCLED MATERIAL MIX

This innovative recycling system can enable your Asphalt Mixing Plant to produce mix consisting of 100% recycled asphalt (RAP).

Essential to the RAH100 is its gentle heating process. During the warm mix process, the dryer can heat materials between temperatures of 100°C and 130°C. It can also make asphalt at 140°- 160 ° if a more traditional mix is desired.

The heating is where usually the complications with RAP material arise. RAP must reach its target temperature, but the valuable bitumen will be damaged if the material is heated too quickly.

The RAH100 recycling drum from Ammann eliminates that concern. It consists of two connected sections. One is a hot gas generator that contains a burner and forces air toward the second section, which is a counterflow dryer.

The RAP enters at the far end of the counterflow dryer section and moves toward the heat chamber. At the end of the counterflow dryer, RAP is transported to an accompanying silo. The heated RAP mix leaves the dryer before the temperature becomes excessive, so it never reaches the critical temperature where the bitumen is damaged.

Highlights

Low bitumen damage

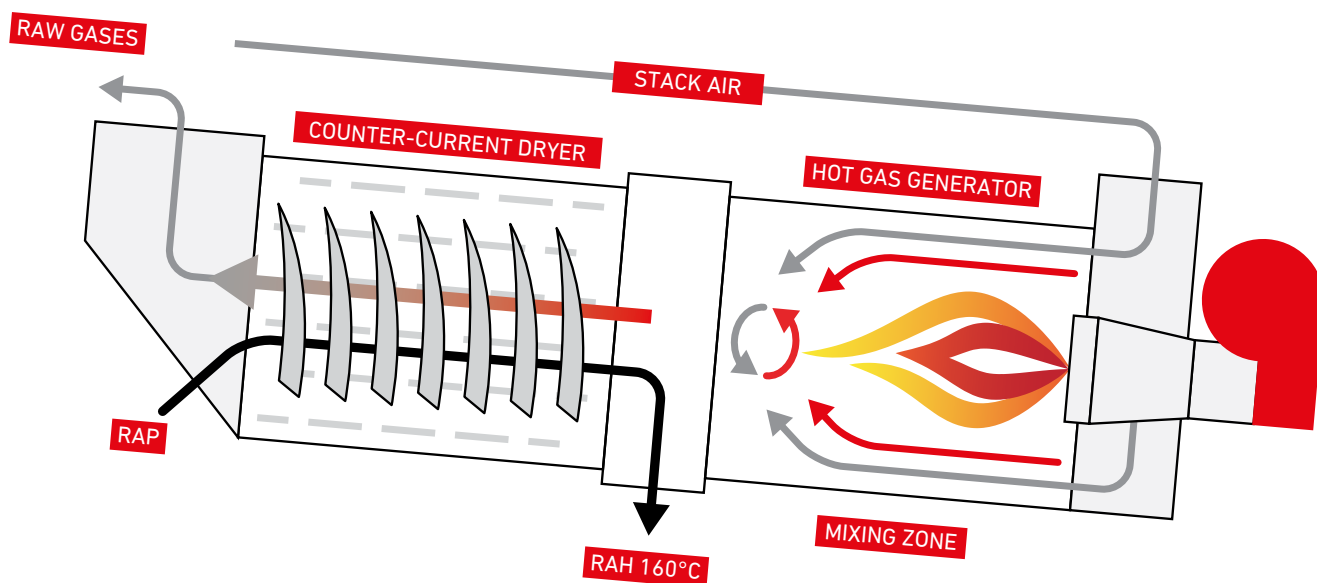
- No radiation heat
- Gentle heating of RAP

High efficiency

- Low exhaust temperature
- High RAP temperature

Low emissions

- Indirect heating
- Homogenous heat distribution
- Recycling rates up to 100 % are achievable
- Enhances chances of approval by governmental agencies
- Recipes are more flexible as there is no need to overheat the minerals



Low bitumen aging

Mild heating of RAP
not exposed to flame radiation

High thermal efficiency

Counter-current dryer
Low raw gas temperatures

Low emissions

Indirect heating by convection
Low raw gas temperatures

OVER 12 MILLION TONS
HOT MIX
PRODUCED MIX WITH THE RAH100

MORE THAN
10 YEARS
ON THE MARKET

SAVED OVER
300
MILLIONS TONS CO₂



LOW-TEMPERATURE ASPHALT

Innovative and forward-looking

Lowering the manufacturing temperature opens up new opportunities for asphalt as a construction material. Lower energy costs and less emissions are only part of the positive characteristics of low-temperature asphalt. Despite the growing number of varied solutions that have appeared on the market we believe that it is not enough to focus exclusively on a particular method of introducing additives or foam bitumen. The entire process chain is affected, starting with drying at a reduced temperature through to specific mixing sequences and on to the introduction of recycling. Ammann has focused their research and development on the complete manufacturing process for low-temperature asphalt with an injection device being simply the beginning. We would be pleased to advise you on how best to make this important step forward.

Energy efficient, low emission and CO₂-optimised

New technologies enable the manufacturing of asphalt at reduced temperatures. The energy consumption per tonne of asphalt and the emissions at the road construction site drop significantly. Whilst conventional asphalt is produced at around 170 °C, the low-temperature processes of today allow production temperatures of around 100 °C. Ammann offers various technologies for this. Foam bitumen, waxes and other additives, special bitumen or alternative mixing cycles can be suitable for use, depending on the application.



AMMANN FOAM[®] GENERATOR

THE IDEAL ADD-ON FOR ANY ASPHALT-MIXING PLANT

Ammann is convinced that the future lies with low temperature asphalt. In cooperation with customers and laboratories, we have developed the Ammann Foam process. This process is based on the the foaming of bitumen with water and will be employed in our continuous and batch plants. Ammann foam works without any chemical additives and can also be retrofitted to existing plants with minimal effort.

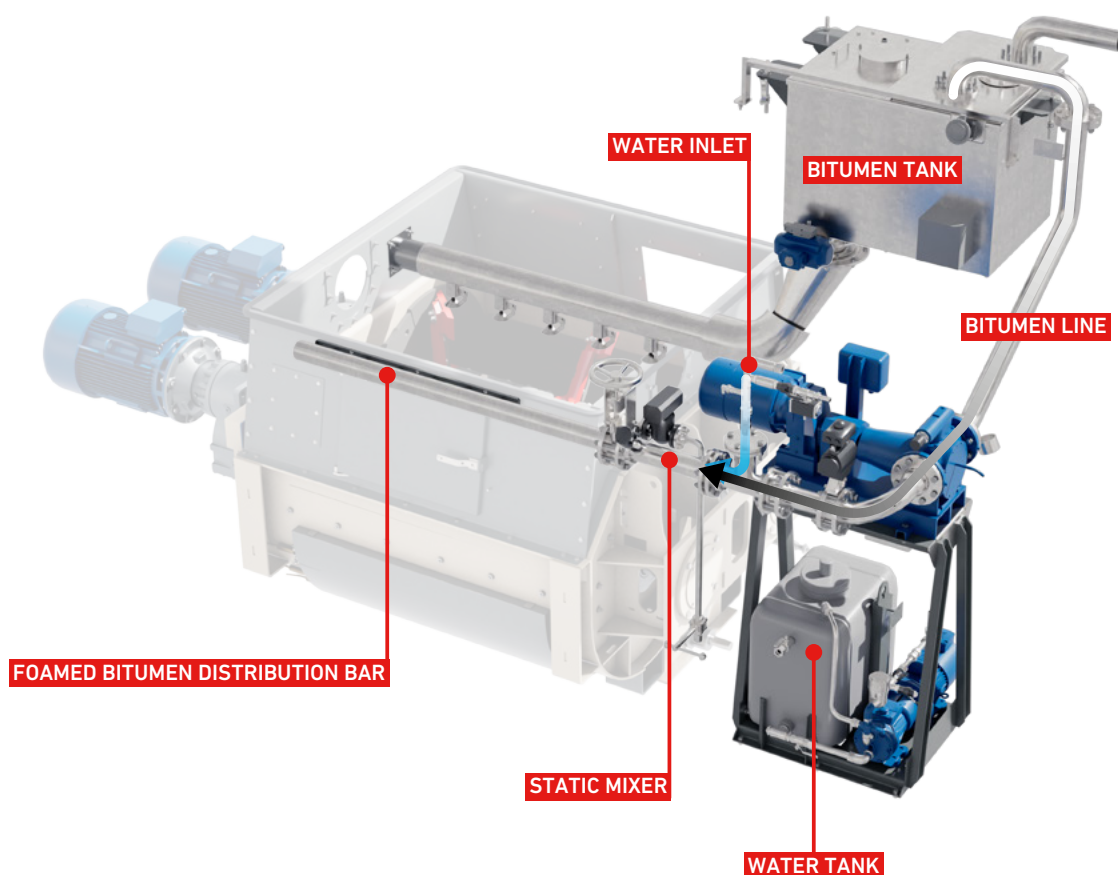
Highlights

- Heating of the raw aggregate to approx. 115 °C
- Perfect mix of bitumen and aggregates
- Compaction of the asphalt at low temperatures
- Foam generator can be integrated into continuous and batch plants
- Retrofitting to existing plants possible.

The foam generator

A foam bitumen installation enables you to expand the product portfolio of your mixing plant. The foam generator from Ammann enables the foaming of various different hardnesses of road construction bitumen and also polymer modified bitumen. It can also be used to manufacture cold base courses with 100% recycled materials for example. This means that the use of foam bitumen optimally supplements the recycling feed in the mixer.

FOAM BITUMEN OF COLD OR LOW-TEMPERATURE ASPHALT



BURNERS

INNOVATIVE AND FORWARD-LOOKING

The Ammann burner provides the thermal energy used to heat and dry raw materials. Cutting-edge technology enables highly efficient combustion of a wide range of fuel types. Low emissions and high safety standards are basic principles behind the burner's development.

ENVIRONMENTAL AND CLIMATE FRIENDLY

Ammann burners preserve the environment by economical use of energy:

- The use of a frequency converter saves fuel and electrical energy by helping that the burner fan only ever provides as much air pressure and air volume as is required for combustion. That is how the frequency converter prevents energy waste.
- Monitoring the temperature of the combustion air helps to adjust the amount of combustion air depending on changing weather conditions. This prevents, for example, when the ambient temperature cools on cold days, that too much air or too much air mass is fed into the combustion. This saves fuel and electrical energy and prevents waste of energy.



ALTERNATIVE FUELS

Ammann burners can be powered by various fuels: Liquid, solid or gas.

- Light oil
- Heavy oil
- Waste oil
- Bio oil
- Kerosene
- LPG
- Natural gas
- LPG in a gas state
- Coal dust
- Wood dust

Fuel selection is driven by local availability, enabling cost optimisation and ecological considerations. The share of renewable fuels continues to grow. In the near future, hydrogen will increasingly replace fuels that are harmful to the climate.

WOOD DUST BURNER

The burner transforms wood dust, a material that is available from local sources, into a renewable fuel – a key benefit in any industry, including asphalt production.

Turning the wood dust into fuel was only the start. What made the wood dust burner even more notable was its carbon neutrality. The carbon dioxide released when burning wood (about 1900 grams CO₂ for each 1000 grams of wood burned) is offset by the fact the tree consumed this amount of carbon dioxide during its life. Therefore, this part of the emissions is carbon-neutral. The goal of carbon neutrality is to minimise the impact on the environment by reducing the level of greenhouse gases in the atmosphere.

The burner has proven effective and is utilised on a number of Ammann Asphalt-Mixing Plants. It can be retrofitted on existing plants as well.

In some cases, the renewable and carbon-neutral fuel is being used to transform recycled asphalt into new mix, providing a host of additional green benefits.



LOW NOX BURNER

Ammann burners are constantly being developed and improved. . It is planned that in the summer of this year, at the latest in September, a successfully completely newly developed burner will be put into series production. An important point is the reduction of NO_x. Ammann burners generate significantly less NO_x than permitted by laws, standards and local regulations.

Thus Ammann burners reduce the burden on the environment and thus protect human and animal health.

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