

A WIRTGEN GROUP COMPANY



**BENNINGHOVEN**



NEW BURNER GENERATION  
**HYDROGEN FUEL**



# GAME CHANGER

**100 % green hydrogen system  
for road construction**

**ZERO**  
CO<sub>2</sub>

UPTO  
**100 %**  
HYDROGEN

**LOW NO<sub>x</sub>**  
TECHNOLOGY

## **SUSTAINABLE ASPHALT PRODUCTION**

- > 4 fuels simultaneously in 3 physical states
- > Mixed use of fuels
- > On-the-fly fuel changes
- > Automatic switching during peak loads (gas)
- > Remote - direct access to the burner control
- > Sound emissions of the new burners were lowered by 5 dB
- > Air flow in the burner was optimised - electric power consumption was reduced by 20 % while retaining the same feed capacity
- > The efficiency of thermal transfer was increased significantly - through optimum use of the burner chamber



**BENNINGHOVEN**  
SUSTAINABILITY

## Innovative burner technology

BENNINGHOVEN is a world market leader in burners for asphalt mixing plants and a manufacturer of multi-fuel burners with up to 4 fuels. The complete know-how and wealth of experience from over 70 years of burner competence support the development of unique burners with excellent properties.

### 01 Unique burner with excellent properties

Asphalt production is the greatest factor on the path to making the future of road construction sustainable. Low-temperature asphalt, up to 100 % recycling content and now hydrogen as an eco-friendly energy source are sustainable, future-proof and economically viable solutions for substantially reducing emissions.





## Eco-friendly asphalt production

### 02 Hydrogen - 100 % emissions-free

Green hydrogen is currently the most sustainable fuel available. It produces no greenhouse gases and its high energy density makes it ideal for thermal processes. Plant owners who want to use hydrogen as an energy source are still faced with a limited infrastructure in many areas.

Asphalt mixing plant specialist Benninghoven supports customers through its network to overcome these difficulties.

### 03 Hydrogen as an energy source - sustainable and future-proof

- > No greenhouse gases
- > Renewable energy, from green electricity
- > High energy density - suitable for thermal processes
- > No use of arable land - no competition with food production
- > Investments in the H2 sector will increase until 2050
- > Demand for 2,500 TWh/a of H2 expected (Europe, 2050)



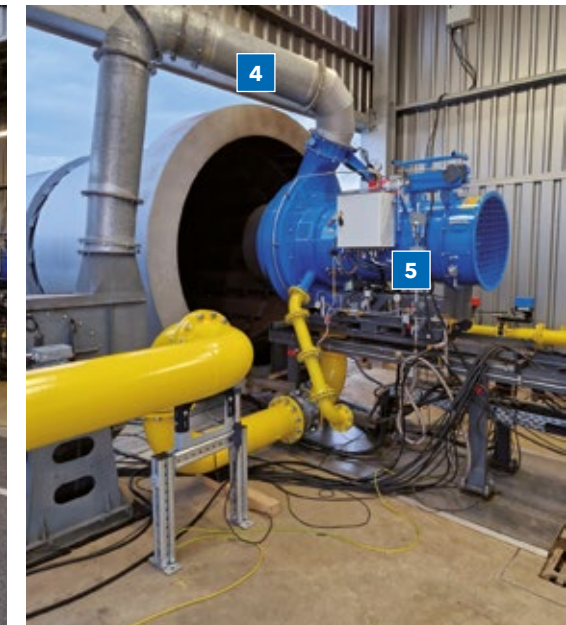
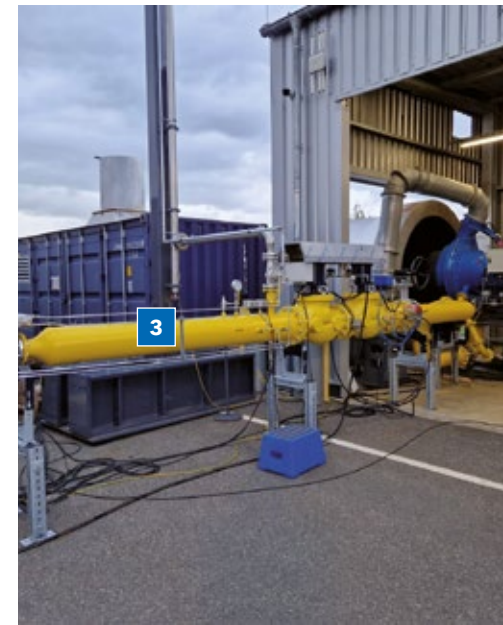
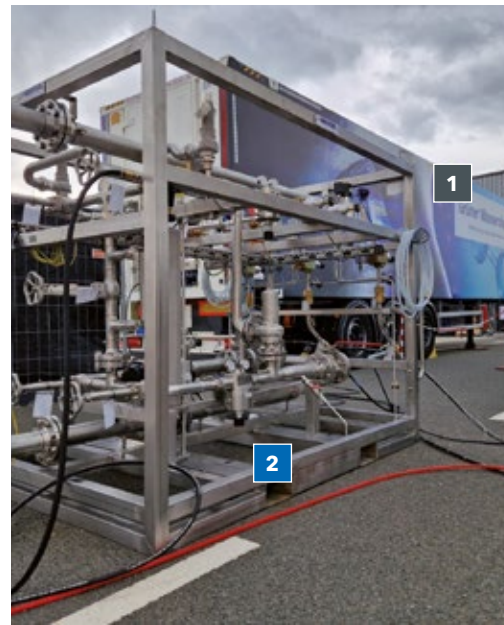
## For safe and reliable performance

### 04 Complete solution from a single source

- > **Feed system** from the hydrogen source
- > **Pressure control section** | can fulfil the following functions:
  - >> Trailer delivery
  - >> Connection to electrolysis
  - >> Pipeline
  - >> Storage tanks
  - >> Hydrogen distribution in the pipe network
- > **Multi-fuel burner**
- > **Hydrogen control section**
- > **Burner control system**
- > Plant components adapted to hydrogen **operation**

1. Mobile hydrogen tank
2. Pressure control section: Safe supply of hydrogen to the hydrogen control section and the burner.
3. Hydrogen control section: To ensure the burner function, but also for general safety, the required volume of hydrogen is fed to the burner through the hydrogen control section.
4. Inert gas recirculation
5. Burner

\* Example of a complete solution





# NEW PLANTS AND RETROFITS

Perfectly positioned

## 05 Burner technology for new and existing plants from any manufacturer

Burner technologies from BENNINGHOVEN, the specialist for asphalt mixing plants, are always designed to work with new plants as well as with existing asphalt mixing plants.

This applies not only to Benninghoven asphalt mixing plants. This and other retrofits can also be implemented for plant from other manufacturers, giving any plant owner the opportunity to change to the latest technology at any time.

This is a key aspect for pioneering, economically viable and sustainable asphalt production and consequently for securing the future of the site in the long term.



# NEW BURNER CONTROL

Easy operation - strong performance

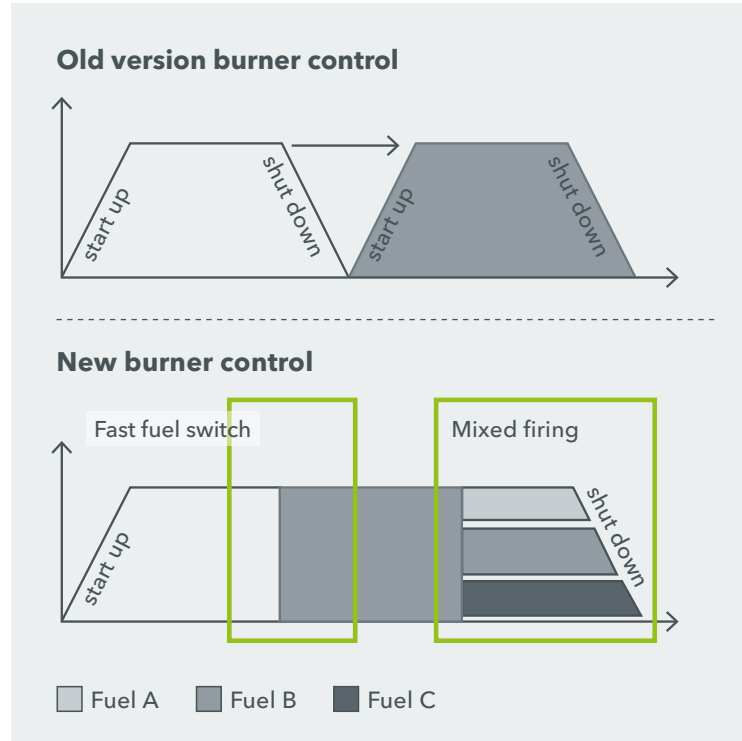
## 06 Burner and control as a complete system

The hydrogen burner from Benninghoven is supplied with an intelligent control system because coordinated hardware and software solutions ensure an efficient asphalt production process.

This includes, among other things, controlling the feed systems including the pressure control section, the drying section with burner and the burner control system.

Switching between fuels or combining several fuels is possible on the fly, i.e. without shutdown, without downtime and only minimal temperature fluctuations during the process.

Up to four different fuels can be used at the same time with this system. This flexibility increases the economic efficiency as plant owners can always use the optimum available energy source.



## 07 Remote - direct access to the burner control

Remote service option for direct access to the burner control system and diagnostics of individual signal inputs and outputs

First level support



Plant



Plant control

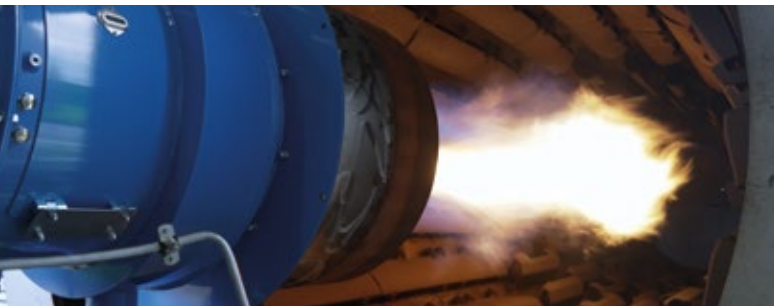
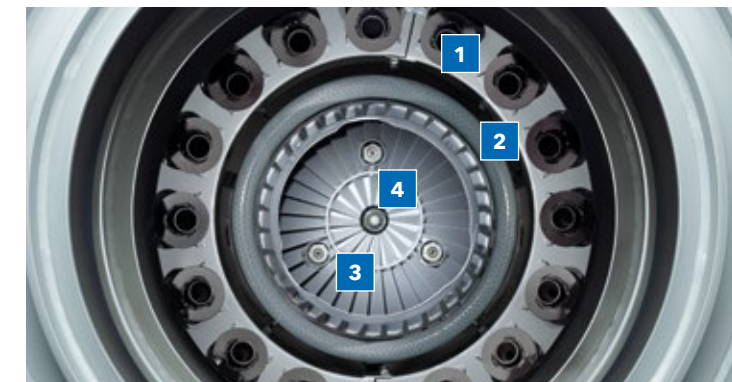


Burner control

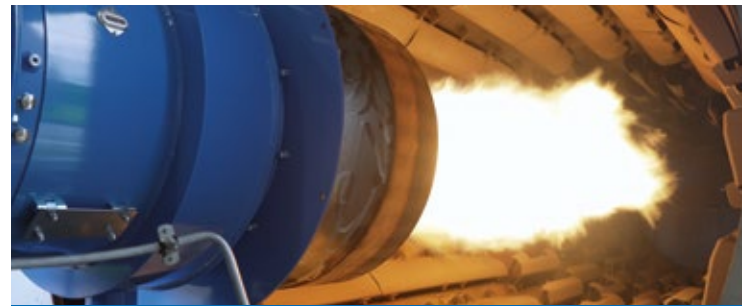
## 08 Multi-fuel burner - fuel change at the press of a button

Flexible and simultaneous use of four fuels in three different physical states

1. Solids ring / gas nozzles: solids or hydrogen
2. Gas ring: natural gas
3. Gas nozzles: LPG
4. Oil nozzle: light oil



Mixed firing



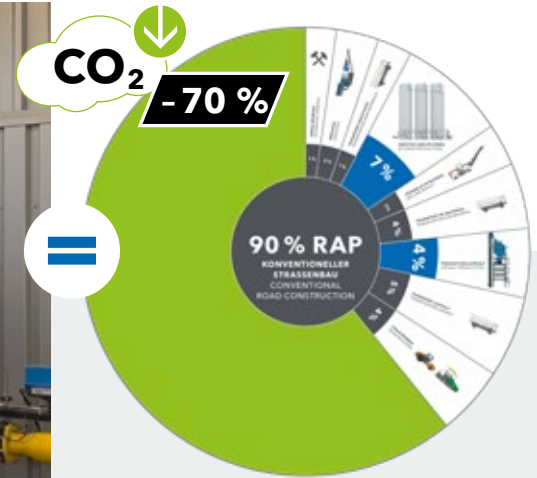
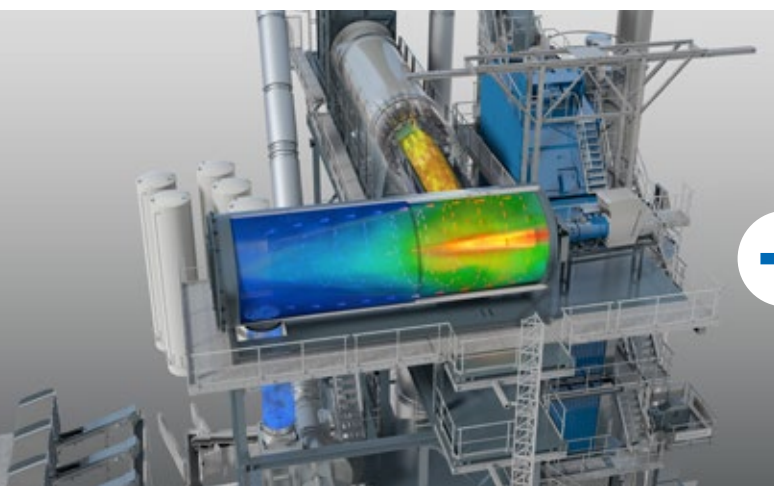
Fast fuel switch





# SMARTER. SAFER. MORE SUSTAINABLE

The greatest potential for saving CO<sub>2</sub> in an asphalt mixing plant lies in the choice of fuel.



Recycling system

Combined with

- > CO<sub>2</sub> neutral / CO<sub>2</sub> free energy source
- > Renewable energy source

70% reduction of the total CO<sub>2</sub> emissions in conventional road construction





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