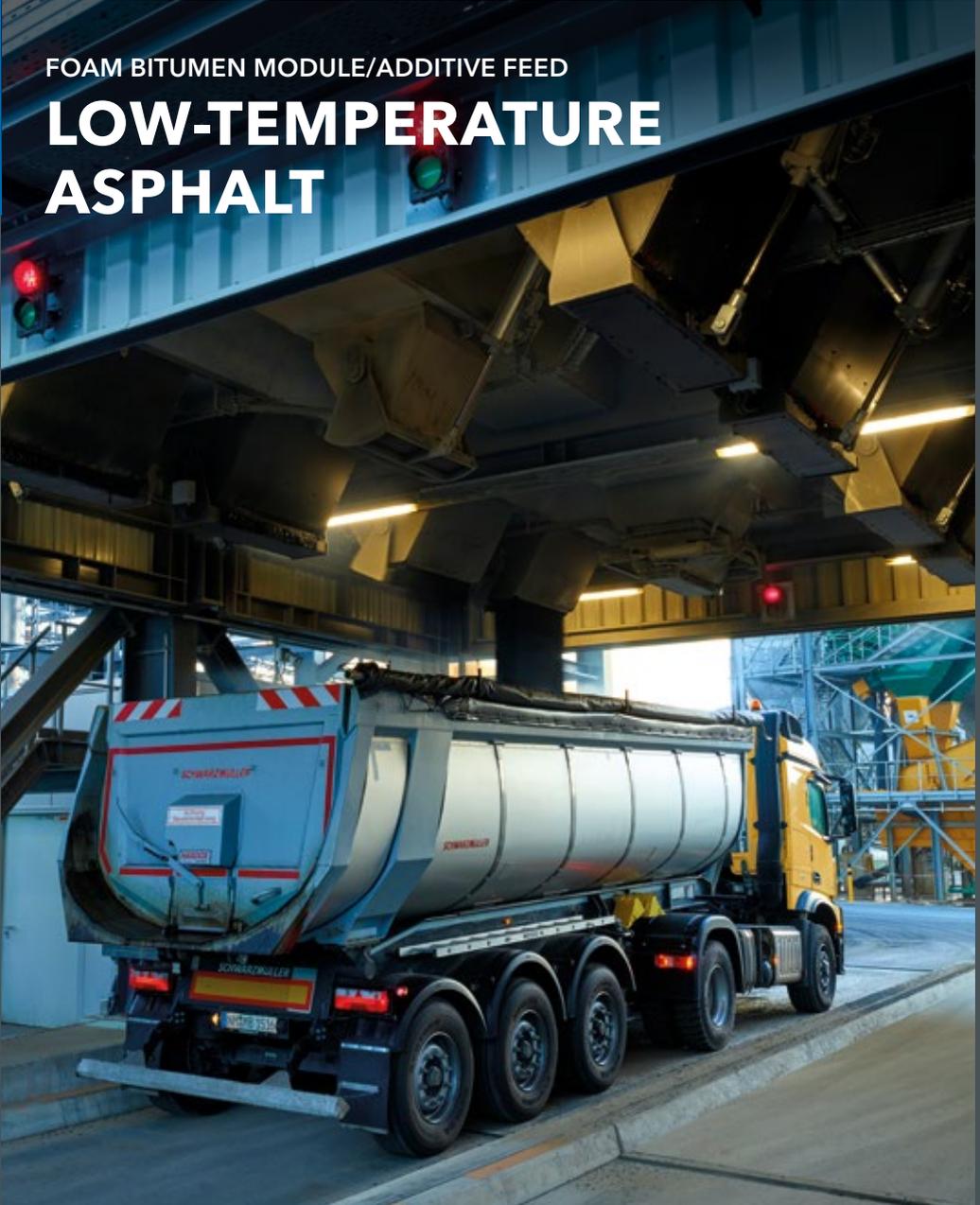




FOAM BITUMEN MODULE/ADDITIVE FEED

LOW-TEMPERATURE ASPHALT





**TOP QUALITY
STATE OF THE ART**

**Pace setter for the
highest demands.**

State of the art! This is an approach that BENNINGHOVEN has been following for more than a century. Through consistent further development, growing from a trade workshop to a globally active company, BENNINGHOVEN has become a pacesetter in the field of asphalt mixing plants today. The opening of the world's most modern factory for asphalt mixing plants in summer 2018 was another milestone in our successful history. This allows us to offer our customers the best possible solutions when it comes to producing the highest quality asphalt in an economical process.

BENNINGHOVEN GmbH & Co. KG is a member of the expanding, worldwide active WIRTGEN GROUP which has been part of John Deere since late 2017.

BENNINGHOVEN

All roads lead to Rome.

LOW-TEMPERATURE ASPHALT



Low-temperature asphalt is asphalt that is produced and processed at a lower temperature without any negative impact on its properties.



The difference is in the temperature

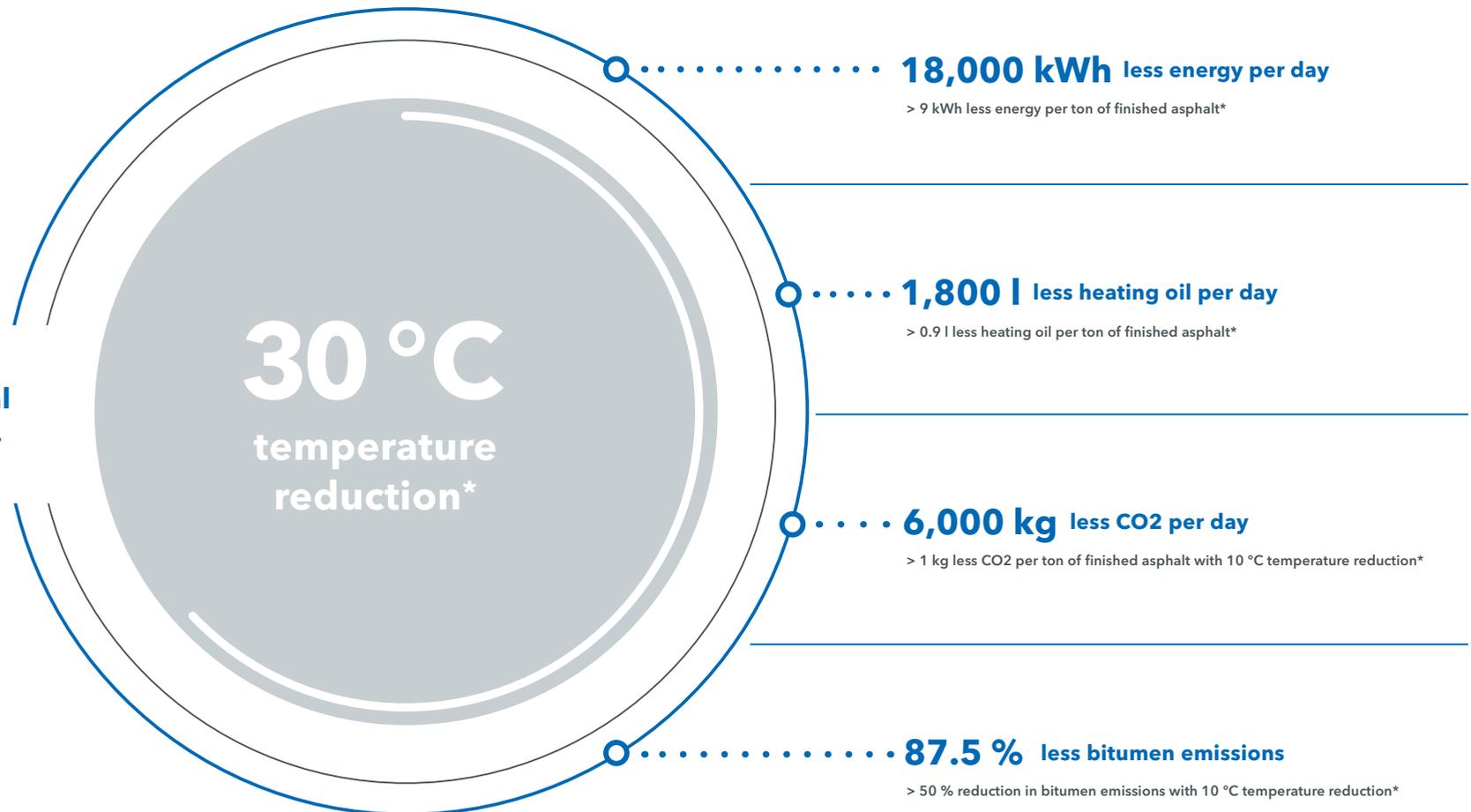
The crucial difference compared to conventional hot asphalt is the processing and laying temperature. In numbers, this is a temperature reduction of 20 - 40 °C. The accompanying effects in production and application include the improved overall energy balance and the reduced emissions during production as well as the lower workplace exposure during laying of the asphalt.

BENNINGHOVEN is your reliable partner for this as well. Whether with the **FOAM BITUMEN** MODULE technology or by adding various additives with feed systems - we have the answer to your individual requirements. With Plug & Work, the system can be quickly retrofitted to any plant at any time.

Individual, state-of-the-art technical solutions.

Focus on temperature.

* Deutscher Asphaltverband e.V., asphalt Leitfaden, Temperaturabgesenkte Asphalte
(Asphalt Guide, Low-Temperature Asphalts - published by the German Asphalt Association)



Enormous potential for energy savings.



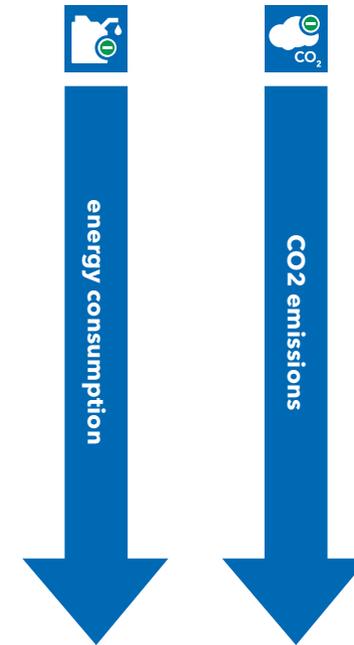
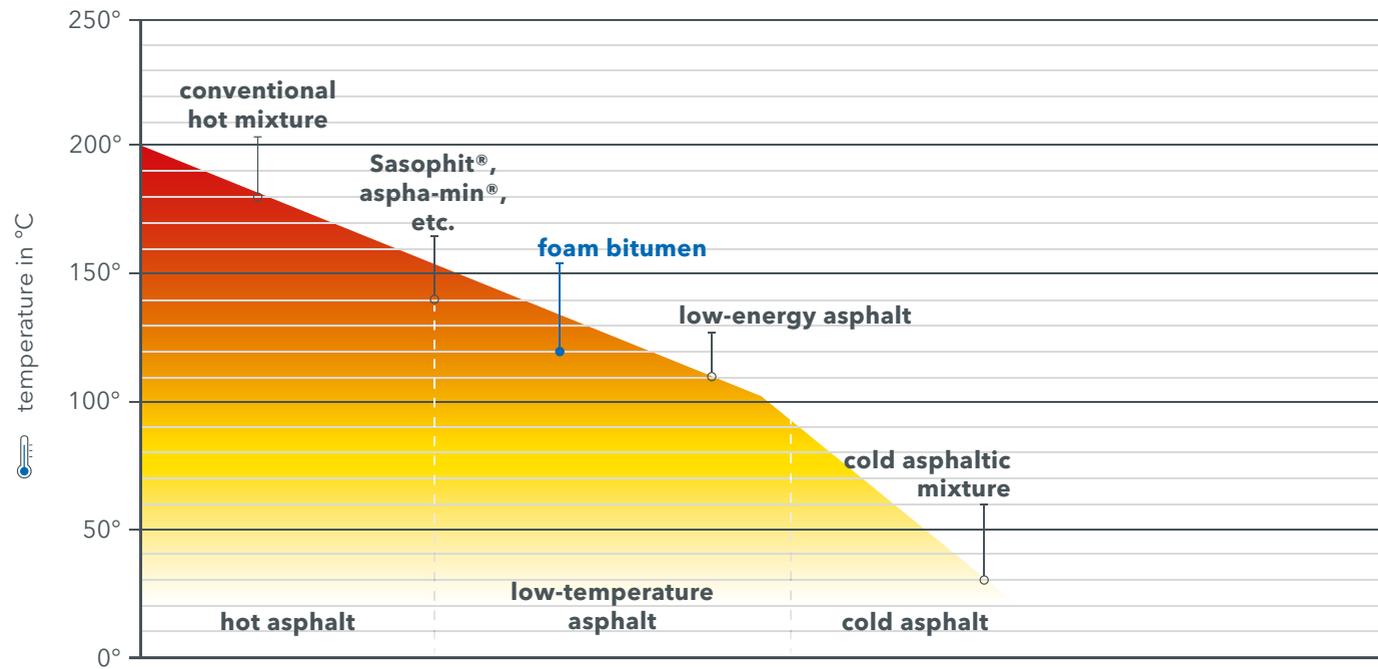
Savings based on a daily production of 2,000 t of asphalt

Focus on temperature.

SUBSTANTIAL ENERGY REDUCTION

>>

Overview of the temperature levels during the production of hot asphalt, low-temperature asphalt and cold asphalt: Foam bitumen is the favoured binder in order to produce low-temperature asphalt. It also offers a high mixture quality in a range from 110 °C to 130 °C.



The facts at a glance.

LOW-TEMPERATURE ASPHALT



Environmental protection

- > High energy savings
- > Reduced emissions



Saving resources

- > Lower total energy requirement
- > Lower fuel consumption



Health and safety

- > Reduced vapours and aerosols during hot processing of bitumen
- > Reduced workplace exposure
- > Protection of workers during production, transport and laying
- > Lower heat impact for personnel
- > Compliance with new workplace limits



Gentle on the material

- > Reduced ageing of the bitumen binder
- > Gentle on structural elements due to lower thermal load
- > Lower wear on the asphalt mixing plant



Economy

- > Extended delivery radius (foam bitumen technology)
- > Longer transport times possible



Our winning formula.

PROCESS TECHNOLOGY

The desired temperature reduction during asphalt production is achieved by temporarily reducing the bitumen viscosity with water or additives.

>> A temperature of around at least 140 °C is required for the bitumen (binder) to wet/coat the mineral. At lower temperatures, its viscosity is too high. The flowability, i.e. the viscosity, also depends on the bitumen type and can therefore vary greatly between the different bitumen types. Viscosity depends on temperature and type, i.e. hard bitumen has a higher viscosity than soft bitumen at the same temperature. Common temperatures are between 140 °C and 180 °C and the typical temperature is around 150 °C to 160°C.

A sufficiently high binder viscosity is necessary to achieve good wetting and coating of the aggregate in the mixer. In addition, the elasticity of the asphaltic mixture plays an important role during the asphalt laying process and the compactability during laying.



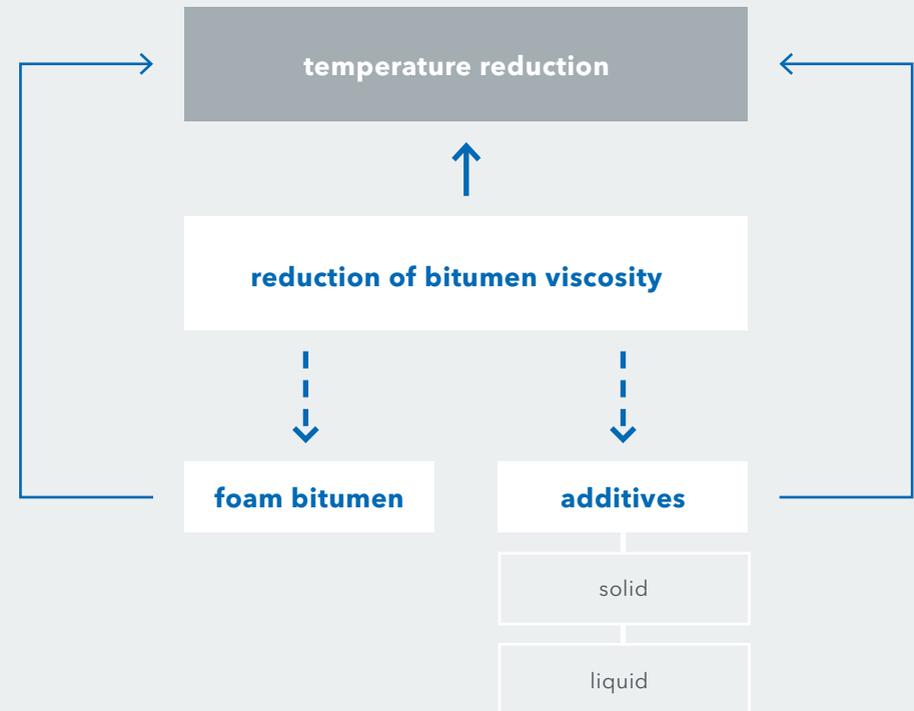
HIGH EFFICIENCY

- + Low variable costs
- + Water is available at every asphalt mixing plant
- + The water supply causes neither hazards nor high costs

The paths to low-temperature asphalt

Low viscosity of bitumen can be achieved through the foam bitumen technology or with additives. When hot bitumen is mixed with water in the **FOAM BITUMEN MODULE**, the bitumen foams up to many times its original volume. This not only lowers the viscosity temporarily, but the larger surface also improves the wettability of the aggregate material.

The water is added directly into the mixer through the injection bar. With the exception of the bitumen foaming, the asphalt mixing process remains unchanged. Because the bitumen viscosity is minimised, the mineral does not have to be heated as high as for hot asphalt. Solid or liquid additives can be used as an alternative.



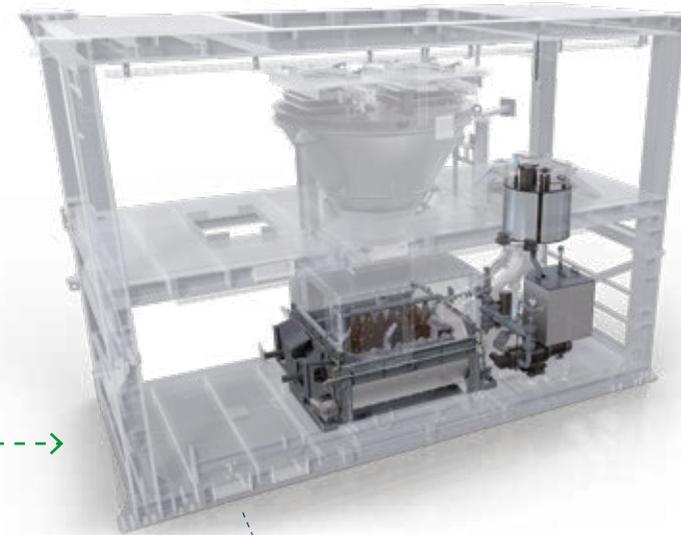
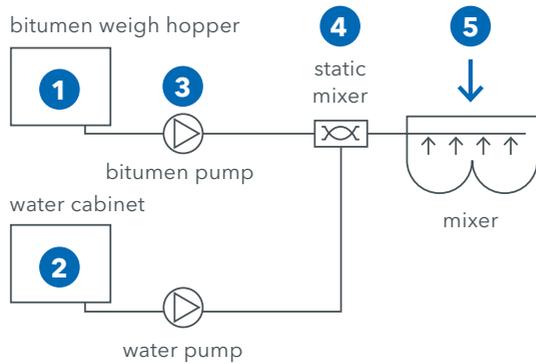
Get going.

FOAM BITUMEN MODULE

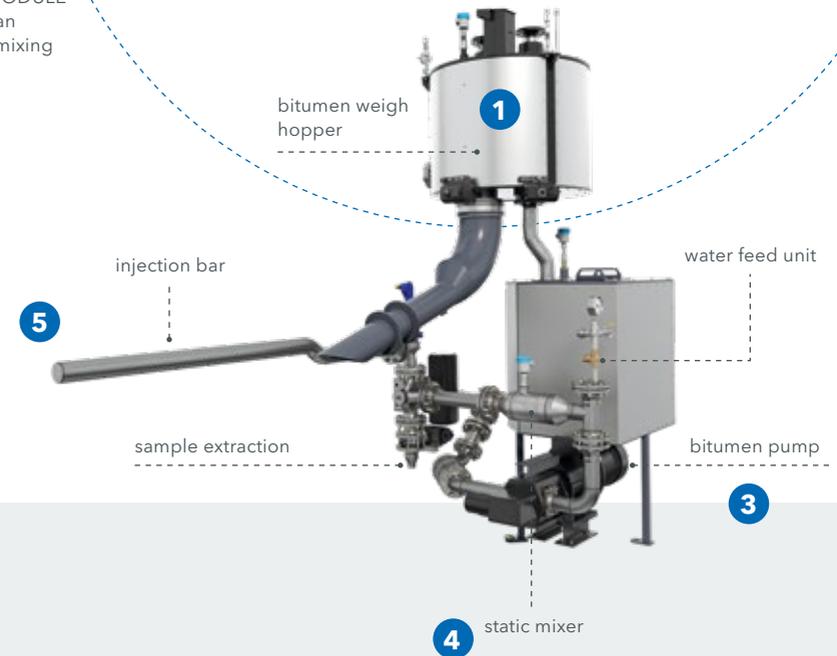


Fast installation and commissioning

For the technical implementation, the weighing and mixing section simply has to be expanded with the **FOAM BITUMEN MODULE**, which is additionally flanged onto the mixer cabinet and the bitumen weigh hopper.



FOAM BITUMEN MODULE on the example of an RPP weighing and mixing section



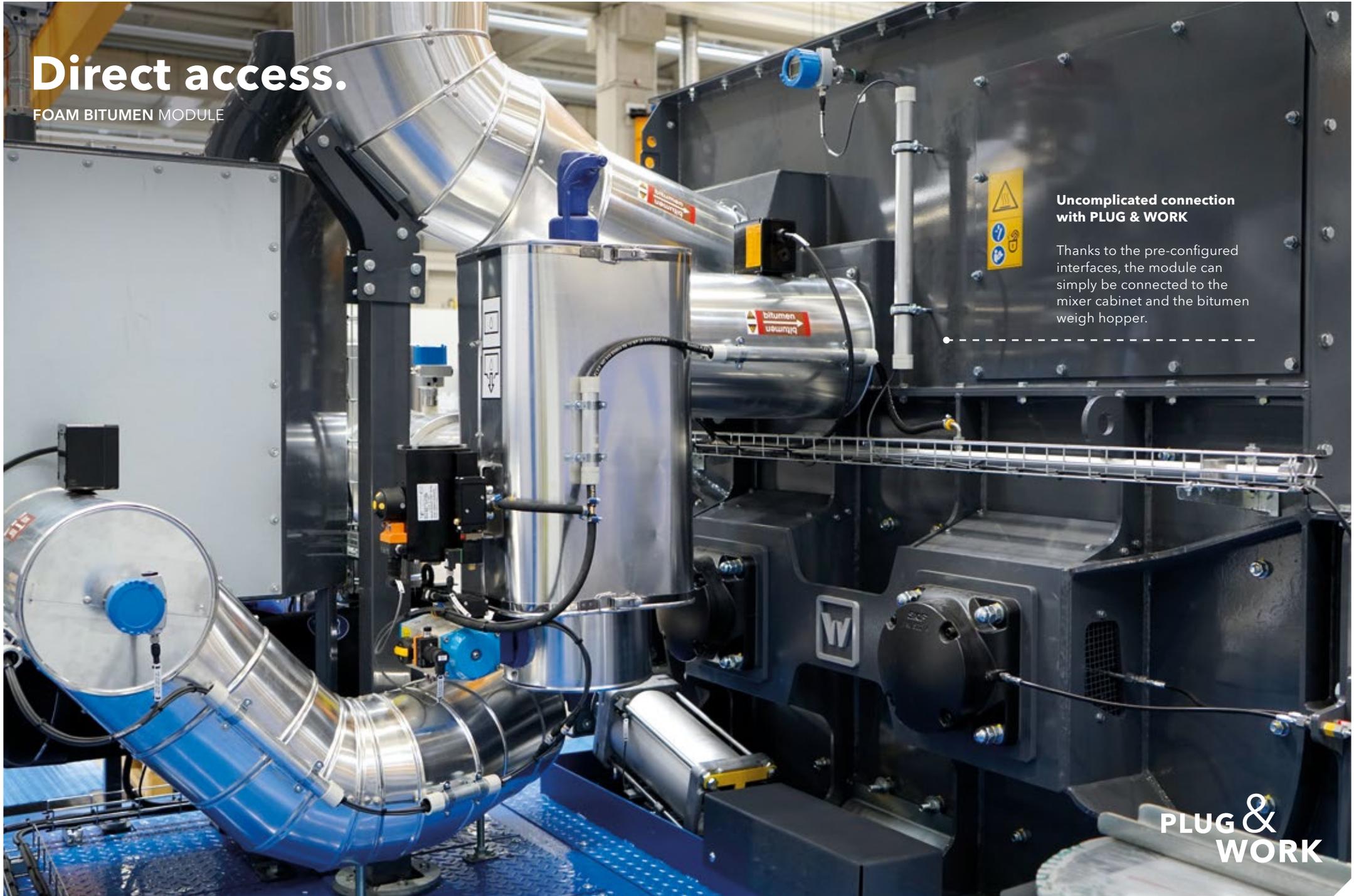
Direct access.

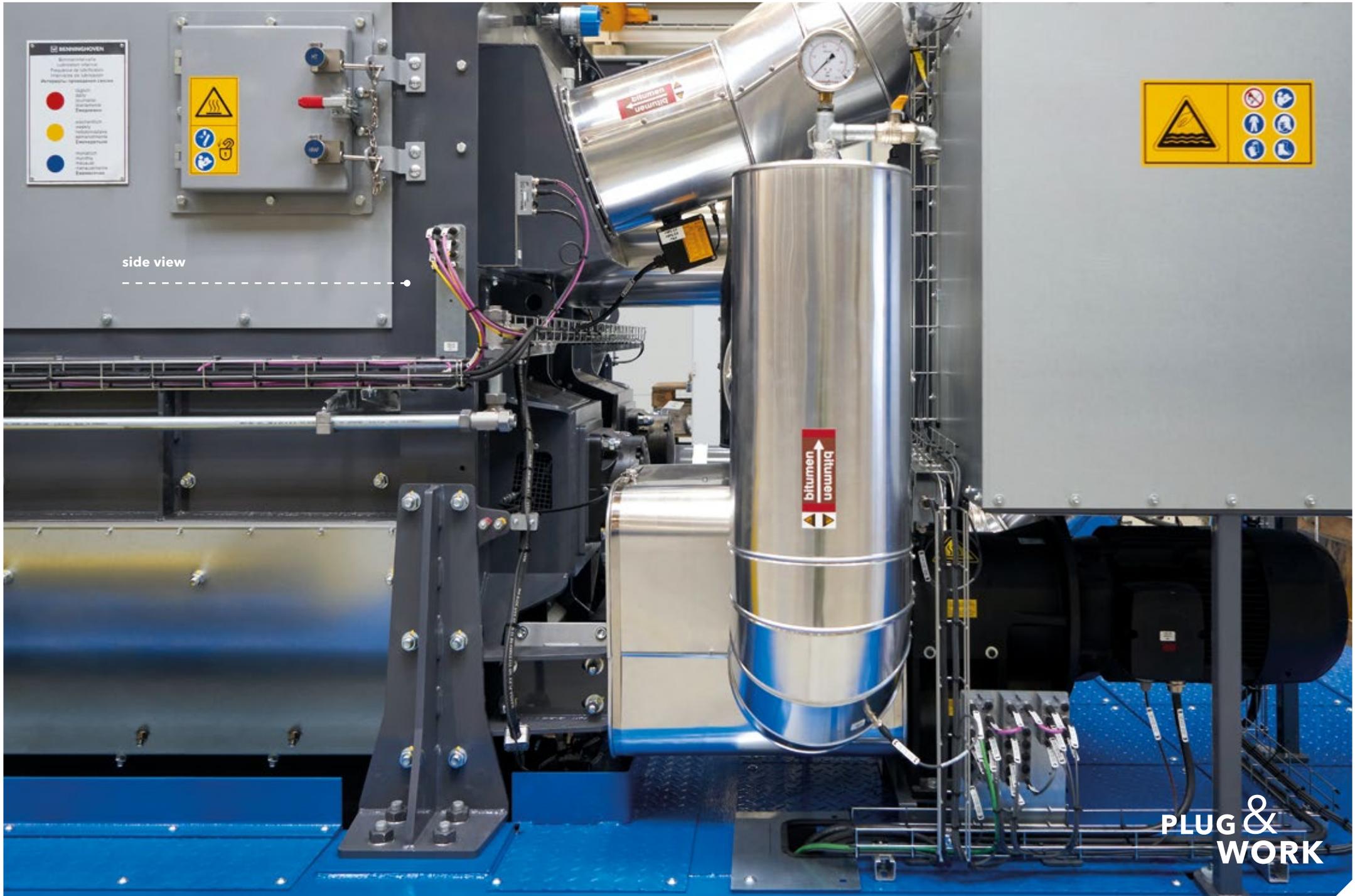
FOAM BITUMEN MODULE

Uncomplicated connection with PLUG & WORK

Thanks to the pre-configured interfaces, the module can simply be connected to the mixer cabinet and the bitumen weigh hopper.

**PLUG &
WORK**





side view

PLUG & WORK

Systematic feeding.

HANDLING ADDITIVES

1. SOLID ADDITIVES - ADDED DIRECTLY INTO THE MIXER



> Smaller quantities

Granulate dosing system

Max. quantity added per batch: up to 12 kg



Powder feed

Max. quantity added per batch: up to 30 kg



> Larger quantities

Multi-variable feed

- > Feed with inclined conveyor or elevator
- > Extremely precise dosing thanks to high-precision weighing technology
- > Additive quantity up to 40 % of the batch volume





2. LIQUID ADDITIVES

Adhesive system

- > Option in order to add up to two liquid additives
- > Dosing into the bitumen weigh hopper and/or directly into the mixer
- > Capacity 400/900 l/h
- > High temperature resistance
- > Very good chemical resistance





BENNINGHOVEN



BENNINGHOVEN
Branch of Wirtgen Mineral
Technologies GmbH

Benninghovenstraße 1
54516 Wittlich
Germany

T: +49 6571 6978-0

M: info@benninghoven.com

 www.benninghoven.com