

Application**brief**

Eclipse Product: RatioStar Duct Burner

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Application: Asphalt Recycling Process

Description: In 2012, Eclipse supplied a large RatioStar duct burner for a unique new application at the Rotterdam Asphalt Plant in the Netherlands. This project by Volker Stevin Materieel (VSM) Dordrecht, in cooperation with KWS Infra and the Swiss company, Ammann, is the world's first sustainable asphalt recycling system.

The new process, called HERA (Highly Ecological Recycling Asphalt), was developed to be cleaner, better, and cheaper. With current recycling systems, the asphalt is heated with direct firing, which degrades the quality of the asphalt and creates other negative side effects. Direct heating vaporizes

hydrocarbons from the bitumen in the asphalt and discharges hazardous pollutants into the atmosphere. The exhaust stack also emits a strong odor and visible blue smoke.



The RatioStar Solution

With the new HERA System, the asphalt is heated indirectly with the Eclipse RatioStar duct burner. The indirect hot air stream is recirculated around satellite tubes within the drum, inside which the asphalt is heated and dried, while rotating gently. The process air stream has very low oxygen (< 5%) and a relatively high temperature. The inlet temperature

for the burner is 320°C (608°F) to 350°C (662°F), and upstream from the burner, it operates up to 800°C (1472°F). The combustion air for the burner is preheated by the exhaust of the recirculation flow to a temperature of approximately 285°C (545°F).

The RatioStar is a modular duct burner designed for on-ratio control. It was specified for this application because of its ability to use preheated air and precisely control the gas and air. The RatioStar performs exceptionally well with the low oxygen and high temperature of the process stream. Another big advantage is its in-duct design, which allows for a very compact system. The burner is fired at an excess air percentage of 15 - 30%.

The Results:

By completely separating the combustion gases from the asphalt using indirect heating, numerous positive effects were achieved. The benefits include a more energy efficient process, reduced emissions, 100% recycling of the asphalt, and no unwanted odors from the plant. Another big advantage of this approach is the improved quality of the final recycled asphalt product.

- Energy consumption has been reduced by 5% to 10% (0,5 - 1 M³Gas/Ton Asphalt) by using this highly efficient indirect and closed hot gas system.
- Additional energy savings of 20% are possible by using the condensation heat of the water vapor from the asphalt in an extra preheating drum (planned after test period). The asphalt can then be heated to about 60°C (140°F) to provide a 20% higher capacity.
- Old asphalt can now be added up to a 75% mix with the existing drum mixer, instead of the previous 50% mix. This results in a significant savings of virgin material and costs. Up to 100% recycling is possible with solo production of the HERA drum, but at a lower capacity.
- The recycled asphalt now has a higher quality than with the previous method.
- Old asphalt can be recycled more times through this system.
- Significantly lower dust, C_xH_y, SO₂, and NO_x emissions have been achieved as a result of the change to an indirect heating process.
- Virtually no odors or blue smoke are discharged from the process.
- The heat gas system does not need a dust filter and the exhaust gases flow directly from the chimney to the atmosphere.



Interior view of the heating duct showing the Eclipse RatioStar burner configuration.



Exterior view of the heating duct showing the Eclipse gas train that supplies the RatioStar burners.