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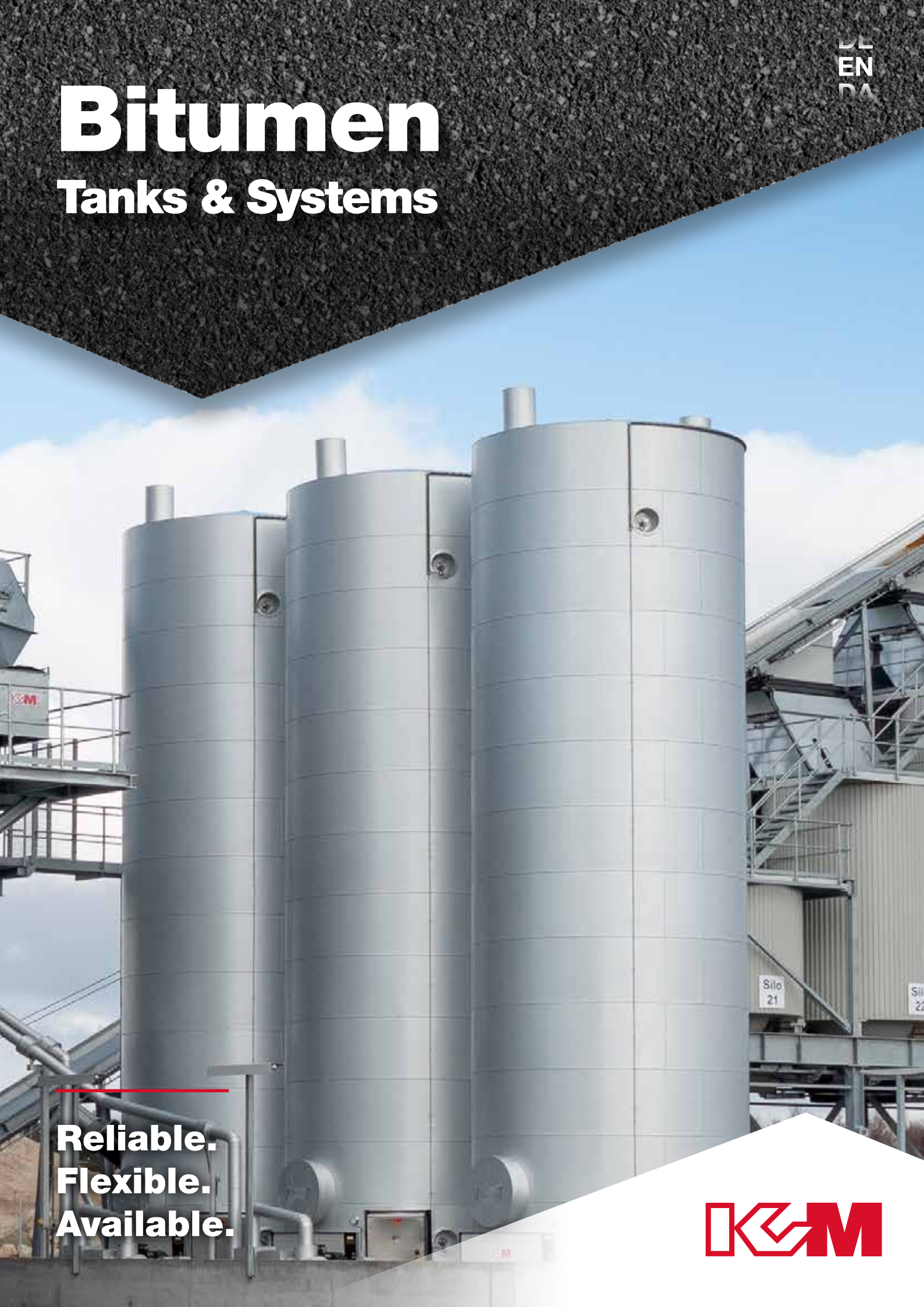
Bitumen

Tanks & Systems



Reliable.
Flexible.
Available.

Bitumen Tanks & Systems

Knowledge

KVM have a comprehensive knowledge in storage, dosing and processing equipment for bitumen. Our technical solutions are based on decades of experience within the asphalt industry, combined with the latest technology that provides solutions for our customers, which are innovative, energy efficient and environmentally friendly. Our team of highly skilled designers, mechanical, and software engineers design, construct and install complete bitumen delivery solutions, whether it be a bespoke or standard system, and where quality, performance, operating safety and cost effectiveness are the principal objectives.

Delivery & Integration

The KVM bitumen systems can be delivered either as part of complete KVM asphalt plant installations or as a retrofit on any plant that is undergoing changes, modifications or the implementation of new operating technology. One example could be integration of a KVM foam-bitumen system that is setting new standards in low-temperature asphalt production in combination with increased amounts of Recycled Asphalt Pavement (RAP). We have extensive experience in integrating mechanical, analogue and digital control systems within existing plants by utilising our industry leading Asphalt Manufacturing Control (AMC) system.

Standards

The KVM bitumen delivery system, machinery and equipment are designed and installed in accordance with EN Standards and Eurocodes. KVM fully conforms to the industry recommendations on the safe handling of bitumen as defined by Eurobitume and the Refined Bitumen Association (RBA).

Rational design leading to savings

KVM bitumen tanks are designed to store bitumen at temperatures around 160-180°C.

The difference between the medium and the ambient temperature must be considered when storing bitumen. It is therefore essential to minimise heat loss through the tank walls. KVM achieves this, uniquely, by specifying highly efficient 300 mm thick insulating material.

In addition, further insulating measures are included in our exacting technical solution in order to avoid thermal bridging. To further enhance efficiency, KVM tanks with a diameter of 3.8m are optimally shaped, offering the minimum possible surface area relative to tank volume. KVM uses flush alu-zinc plated sheeting to clad their tanks, and this too helps to minimise heat loss.

Maintaining material temperatures and minimising heat loss results in material temperature continuity and energy efficiency, thereby realising savings on energy bills.

Optimized heating and safe level control

The tanks are electrically heated by means of rows of heating elements fitted in channels below the tank base. This ensures an even transition of heat and thereby avoids coking. An essential principle in the design of the tanks and their heating system is that heat should only be turned on when necessary.

The KVM heating system works on two levels: low-power for maintaining temperature, and booster-power to raise the temperature, if required. This dual system results in operator controllability and helps to minimise power consumption during operation. Each tank has an individual temperature control system installed in a stainless steel, weather resistant cabinet. The KVM system maintains a perfectly constant temperature in the tank.

Service access to heating elements, sensors and overcooking fuses is provided either via dedicated access panels or within a cabinet located adjacent to the tanks. Level sensors and switches incorporated within the design connect to signals for the HLA and HHLA alarms of the fill control and for the LLA alarm of the heat control, which will automatically turn off the heat when minimum bitumen levels are reached.

HLA = High Level Alarm
HHLA = High-high Level Alarm
LLA = Low Level Alarm

Vertical Tanks

Our series of vertical tanks include gross capacities of 70 to 135 m³. Our 135 m³ tank option is one of the largest available on the market, and is still road transportable. The tanks in this series have an internal diameter of 3.2 m and have a 300 mm thick insulation and flush alu-zinc exterior cladding. The highly efficient insulation and use of alu-zinc cladding ensures minimal heat loss, while maximising durability.

Vertical tanks are fitted with heating system and standard equipment as detailed elsewhere in this brochure. Pipe connections and configurations may be designed to our standard layout or can be customised according to the customer's specific requirements.

Optimized for large volume

Vertical tanks save space due to their installation layout. In doing so, they represent an ideal option where space is at a premium.
Additionally, and beneficially, this configuration ensures that the bitumen is stored in a more calm and positive manner. Use of vertical tanks leads to a reduction in oxidation compared to horizontal tanks, due to the smaller exposed surface area. This in turn leads to greater levels of usable bitumen.

Specifications - Vertical bitumen tanks

Inside diameter mm	External diameter mm	Tank wall height mm	Total height mm	Nominal capacity m³	Available capacity m³	Safe working capacity m³	Heating power kW	Isolation thickness mm
3200	3800	8,000	9,920	70	64	58	12+24	300
		11,000	12,885	95	88	80		
		13,000	14,885	110	105	94		
		16,000	18,145	135	123	116		

Tank capacity definitions:
Nominal capacity: Total tank volume
Available capacity: Tank volume between inlet and overflow pipes
Safe working capacity: 90% of available tank capacity

Horizontal Tanks

The horizontal tanks have traditionally been considered the ideal configuration when combined with low-level asphalt plants, with submerged dosing pumps connected with forward and return pipes. In general, horizontal tanks are convenient to handle, install and to move, since they are permanently positioned on their skids.

Our series of horizontal tanks include gross capacities from 70 to 135 m³. The KVM 135 m³ option is one of the largest available on the market and is still road transportable.

The tanks in the horizontal tank series have an internal diameter of 3.2m and a 300mm thick insulation and flush alu-zinc cladding at the exterior. The highly efficient insulation and use of alu-zinc cladding ensures minimal heat loss whilst maximizing durability.

Horizontal tanks are fitted with heating system and standard equipment as detailed elsewhere in this brochure. Pipe connections and configurations may be designed to our standard layout or bespoke according to customer's specific requirements.

Semi-mobile Tanks

Simpler and less expensive transportation

The installation of a horizontal Semi-mobile tank sees it resting on its own skids, and as an option, it can be delivered with two built-in vertical agitators that can be demounted, if necessary, before transportation. A walkway manufactured from hot galvanized steel runs lengthwise on the top of the tank giving service access to the two agitators.
Further, as an option, the tank can be delivered with a fixed dosing pump, valves, and connections; enabling the tank to be used for filling or moving bitumen from one tank to another.

The semi-mobile horizontal tanks can either be placed on a concrete foundation or on even made-up ground.

Specifications - Horisontal bitumen tanks

Inside diameter mm	External diameter mm	Tank wall length mm	Total length mm	Nominal capacity m³	Available capacity m³	Safe working capacity m³	Heating power kW	Insulation thickness mm
3200	3800	8,000	9,920	70	59	57	12+24	300
		11,000	12,885	95	81	79		
		13,000	14,885	110	96	94		
		16,000	18,145	135	119	115		

Specifications - Semi-mobile horizontal bitumen tanks

Inside diameter mm	External diameter mm	Tank wall length mm	Total length mm	Nominal capacity m³	Available capacity m³	Safe working capacity m³	Heating power kW	Insulation thickness mm
Ø2900	Ø3300	12.500	14.500	84	76	74	12+24	200

Standard **Equipment**

Measuring of levels and temperature

KVM bitumen tanks have, as standard, sensing equipment built-in for measuring levels and temperature. Contents (volume) and temperature are displayed on gauges and on displays adjacent to the tank and at the same time these and other values are made available in the tank control cabinet in the form of signals. The pressure transducer and sensors that measure tank levels are also central components in the HLA and HHLA alarm system, which contributes to improved safety during tank filling.

Electrical panel with internal displays

Each tank has a stainless steel, weather resistant control panel, which contains controls for on and off coupling of the tank heating elements, among other things. The incoming power supply is connected directly into this panel. The panel also has transmitters and displays for 4-20 mA signals from pressure transducers and temperature sensors.

Using a dedicated panel makes possible a stand-alone installation of a tank. Alternatively, and in parallel, the tank can be integrated into the central plant process control system.

Safeguarding against vacuum and overpressure

KVM tanks are fitted with a certified ‘bursting disc’ at the breather pipe connection in order to protect the tank against possible vacuum or overpressure. Air that is displaced from tanks during filling can either be passed through an active carbon filter or fed back into the bulk tanker in order to minimise odour emission

Agitators

Some bitumen such as Polymer Modified (PMB) types are characterised by a limited storage life unless it is stirred continuously.

By fitting one or two top or sidemounted agitators to the tank, the stored bitumen is kept constantly in motion and optimum lifetime and quality is therefore ensured.

The agitators are customised to each specific task regarding gearing, bearings, shaft and impeller specification, depending on the tank volume, bitumen viscosity and blending intensity. Top-mounted agitators for vertical tanks have bearings in both the top and bottom.

The agitators are fitted in a purpose designed frame for the tank during manufacture and can easily be moved for and during transportation.

Agitators

Type	Applications	Power kW
Side mounted 45°	Vertical Tanks	5,5
Top mounted	Vertical Tanks	5,5
Top mounted	Horizontal Tanks	2 x 5,5

Filling & Dosing **Pumps**

Filling pump with HD8 and manifold with valves.

Filling Pumps

The safety of personnel is of the highest priority when handling bitumen, which is especially hazardous during the filling of the tanks from a bulk tanker. Potential hazards and their consequences are mitigated by choosing a central filling pump fitted at ground level immediately adjacent to the bitumen tanks.

To safeguard the operator and to prevent spillage when connecting and disconnecting, the filling pump is fitted with a non-return valve at the connector, along with a ball-type closing valve.

The fill pump housing has built-in heating with thermostatic control. If required, the unit can be equipped with a sampling valve and a manifold with valves if the pump is used to fill multiple tanks.

Odour emission

Odour emission from displaced air is eliminated via either an active carbon filter or a pipe connection to return the air back to the bulk tanker. A customer option for moving bitumen from one tank to another can also be achieved by using the filling pump when the necessary valves and pipe connections are installed.

Control box

The pump is delivered with a filling control box that has a HMI display built into a stainless steel cabinet. The filling control box includes the HLA alarm, which activates when the filling exceeds the normal level, and the HHLA system, that will give an alarm and block further filling. The alarms are visually and audibly signalled with a red-yellow-green lamp and a siren respectively.

The actual tank content, the available capacity remaining and the temperature for the tank is shown on the HMI display.

HMI = Human Machine Interface

Filling pump control box with HMI display built into a stainless steel cabinet.

Dosing pump type HD6 with 3-way valve for local circulation.

Dosing Pumps

Dosing pumps, valves and pipes are specified and dimensioned in accordance with their specific task. Pumps can be run with either a fixed or variable delivery performance by incorporating a frequency inverter within the design.

The pipe line, including the pumps and valves, has electrical trace-heating built-in with a zone divided temperature control system. All pipes and valves are insulated and cladded with a galvanised metal jacket.

Pumps in HD-series

Type	Pipe connection inlet/outlet	Nominal capacity l/min.	Motor power kW	Heating power W	Weight kg
HD 5	DN65 (2½")	400	7,5	1500	290
HD 6	DN80 (3")	617	15,0	1500	350
HD 8	DN100 (4")	950	15,0	1500	400

Foam Bitumen **Systems**

Foamed bitumen has proven to be an ideal product to improve the handling qualities of low temperature asphalt (120-140°C).

Prior to the bitumen being discharged into the mixer, the foaming process requires water to be added to the bitumen in accurately metered quantities and pressures while passing through a special foam generator. KVM Foam Bitumen system equipment can be delivered as part of a complete asphalt plant installation or as a retrofit at existing asphalt production locations.

KVM can offer different types of Foam Bitumen equipment depending on the customer's requirements. Generally, the Foam Bitumen equipment can be integrated into the existing production facility and controlled through the KVM Asphalt Manufacturing Control (AMC) system, where they can be operated from within the plant's control cabin. Foam Bitumen equipment is installed together with the bitumen scale in the mixing tower. The example shown includes a suction pipe, a bitumen pump, water dosing equipment, a foam generator and a distributor boom with nozzles.

A special software extension is installed in the control system to control the process and the post-production cleaning. System flexibility means that the foaming process can be adjusted according to the type of bitumen selected and ensures quick and efficient shifts between production of foamed bitumen and hot mix asphalt.

Bitumen **Melter**

When bitumen is delivered in 200 litre barrels, it has to be heated in order to remove it from the barrels before it can be used. By using the KVM Bitumen Melter, the heating process is accomplished by means of circulating hot air in an enclosed unit. The Bitumen Melter is supplied with a loading platform and a hoist to mechanically handle and place the barrels in two rows in readiness to pass through the heated tunnel. The barrels are then pushed through the melting tunnel by a pneumatic ram system.

The melting tunnel has a capacity to handle 18 barrels, and it is designed to fit into a 40' container for transportation.

The KVM Bitumen Melter has its own independent control system.

Bitumen melter type 200/18								
Width mm	Height mm	Total height mm	Length mm	Melting barrel Kapacitet m^3	Continous capacity (fat/24h)	Oil use Liters/h	Heating kW	Isolation thickness mm
2.240	2.250	4.300	9.600	approx. 7,0	168*	approx. 18	200	100

** at temperature increase of 150 °C*

KVM **Service**

KVM's experienced project design, management and engineering staff offer our customers certainty for optimal progress during design, installation and commissioning of their new machinery and equipment. KVM provides everything from project design through to execution of mechanical installation, including electrical and control systems, installation, and training of your staff. Through the KVM Service Hotline, our technical and service engineers are avaiable 24/7, 365 days a year to provide advice and guidance or to arrange a service visit at short notice if necessary, in order to always ensure your uninterrupted operation.

24/7/365 online service

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