

BITUMEN TANKS AND SYSTEMS



YOUR RELIABLE PARTNER

Bitumen Plant

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 which provides solutions for our customers that are innovative, energy efficient and environmentally sympathetic. 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 bitumen system, and where quality, performance, operating safety, and cost effectiveness are the principal objectives.

The KVM bitumen systems can be delivered either as part of complete KVM asphalt plants installation or as a retrofit on any plant that is undergoing changes, amendments or the implementation of new operating technology. One example could be integration of a KVM foam-bitumen system which 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.

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

ENERGY EFFICIENT BITUMEN TANKS



Rational design leading to savings

KVM bitumen tanks are designed to store bitumen at temperatures around 160-180°C. When storing bitumen, the difference between the medium and the ambient temperature must be considered. It is therefore essential to minimise heat loss through the tank walls. KVM, uniquely, achieves this by specifying highly efficient 300 mm thick insulating material. In addition, to avoid thermal bridging further insulating measures are included in our exacting technical solution. To further enhance efficiency, KVM tanks with a diameter of 3.8m are optimally shaped, offering the smallest possible surface area relative to tank volume. KVM uses flush alu-zinc plated sheeting to clad their tanks, this too contributes to minimise heat loss. Maintaining material temperatures and minimising heat loss results in material temperature continuity and energy efficiency, realising savings on energy bills.

Optimised 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 weather resistant cabinet manufactured from stainless steel. The KVM system maintains a perfectly constant temperature in the tank.

Service access to heating elements, sensors and overcooking fuses is 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



Optimised for large volume

Vertical tanks are by their installation attitude space saving, in doing so they represent an ideal option when space is at a premium. Additionally, and beneficially, this attitude makes sure that the bitumen is stored in a more calm and positive manner. Use of vertical tanks sees 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.

Our series of vertical tanks include gross capacities of 70 to 135m³. Our 135m³ 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 3.2m 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 whilst maximizing 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 bespoke according to customer's specific requirements.

Specifications:

Vertical bitumen tanks								
Inside diameter mm	External diameter mm	Tank wall height mm	Total height mm	Nominal capacity m ³	Available capacity m ³	Safe working capacity m ³	Heating power kW	Insulation 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 outlet pipes

Safe working capacity: 90% of available tank capacity

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 in the form of signals are made available in the tank control cabinet. The pressure transducer and sensors that are measuring tank levels are also central components in the HLA and HHLA alarm system which contributes to improved safety during tank filling.

Securing 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 being 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.

Electrical panel with internal displays

Each tank has a weather resistant control panel manufactured from stainless steel which contains among others controls for on and off coupling of the tank heating elements. 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 allows a stand-alone installation of a tank possible. Alternatively, and in parallel, the tank can be integrated into the central plant process control system.



HORIZONTAL TANKS



Traditional horizontal tanks

The horizontal tanks have traditionally been 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 straightforward 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 135m³. The KVM 135m³ 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 3.2m and have 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.

Specifications:

Horizontal bitumen tanks								
Inside diameter mm	External diameter mm	Tank wall length mm	Total length mm	Nominal capacity m ³	Available capacity m ³	Safe working capacity m ³	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		

AGITATORS



Side and top mounted agitators (option)

Some bitumen, for example, Polymer Modified (PMB) types are characterised by a limited storage life unless it is being continuously stirred. By fitting one or two agitators to the tank the stored bitumen is constantly in motion and as a result optimum lifetime and quality is extended and ensured.

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

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

Specifications:

Agitators			
Type	Application	Power kW	
Side mounted 45°	Vertical tanks	5,5	
Top mounted	Vertical tanks	5,5	
Top mounted	Horizontal tanks	2 x 5,5	

SEMI-MOBILE TANKS

Vertical and horizontal tanks

In order to provide solutions where there is a special demand for movability and flexibility, KVM can supply tanks with smaller dimensions than those described in our standard series. Whilst the capacities may be smaller, the design, manufacturing quality and other characteristics are the same as our standard series. The added value comes from simpler and less expensive transportation and installation. It is of course a matter of individual

judgement, whether the optimum solution is obtained by setting the focus on flexibility and movability as opposed to tank capacity.

Semi-mobile tanks are fitted with a heating system and standard equipment as per the standard series described elsewhere in this brochure. The vertical option can either be sited on a concrete foundation or a special purpose designed steel frame (site/customer option).

Specifications:

Semi-mobile vertical bitumen tank								
Inside diameter mm	External diameter mm	Tank wall height mm	Total height mm	Nominal capacity m ³	Available capacity m ³	Safe working capacity m ³	Heating power kW	Insulation thickness mm
2900	3300	11,000	12,845	77	67	65	10+20	200



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.

Specifications:

Semi-mobile horizontal bitumen tank								
Inside diameter mm	External diameter mm	Tank wall length mm	Total length mm	Nominal capacity m ³	Available capacity m ³	Safe working capacity m ³	Heating power kW	Insulation thickness mm
2900	3300	12,500	14,500	84	76	74	12+24	200

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

FILLING AND DOSING PUMPS



▲
Filling pump type HD8 and manifold with valves.

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



Filling pumps

Personnel safety 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 during connecting and disconnecting, the filling pump is fitted with a non-return valve at the connector along with a ball-type closing valve.

The pump is delivered with a filling control box that has an HMI display built into a cabinet which is manufactured from stainless steel. The filling control box includes the HLA alarm which activates when the filling exceeds the normal level, and the HHLA

Dosing pumps

Dosing pumps, valves and pipes are specified and dimensioned in accordance with their specific task. Pumps can either be run with a fixed or variable delivery performance by incorporating a frequency inverter within the design. The pipe line including pumps and valves has electrical trace-heating built-in with a zone divided temperature control system. All pipes, valves are insulated and over clad with a galvanized metal jacket.



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

system, that will 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. 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 should be filling multiple tanks. Odour emission from displaced air is eliminated either via 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.

Specifications:

Pumps in the 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

HMI = Human Machine Interface

BITUMEN MELTER



Bitumen Melter

When bitumen is delivered in 200 litre barrels, to remove it from the barrels it is necessary to heat it and then move the bitumen to a storage tank before it is able to be used. By using the KVM Bitumen Melter the heating process is achieved by means of circulating hot air in an enclosed unit. The 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, the bitumen is collected in the melting vessel and heated prior to it being pumped to the suitable storage tank. The melting vessel has

two outlet pipes, one is used during normal operation and the other is used for bottom discharge. For delivery transportation the Bitumen Melter is designed to fit into a 40' container. The Bitumen Melter comes complete with operating platform, stairs, handrails, crane/hoist facility and a dismountable exhaust system.

The KVM Bitumen Melter has its own independent control system including a display where data is presented and parameters can be set. The control system can be set up as a stand-alone unit or can be integrated with the KVM Asphalt Manufacturing Control (AMC) system.

Bitumen Melter type 200/18								
Width mm	Height mm	Total height mm	Length mm	Melting vessel capacity m³	Continuous capacity (barrels/24h)	Oil consumption Liters/h	Heating power kW	Insulation thickness mm
2,240	2,250	4,300	9,600	Ca. 7.0	168*	Ca. 18	200	100

*At temperature increase of 150 degrees C.

FOAM BITUMEN SYSTEMS



Foam bitumen for low temperature asphalt (LTA)

Foamed bitumen has proven 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 whilst 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 retro-fit at existing asphalt production locations.

KVM can offer different types of Foam Bitumen equipment depending on the requirements of the customer. 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 shown example includes among others a suction pipe, a bitumen pump, water dosing equipment, a foam generator and a distributor boom with nozzles. A special software extension is installed within the control system to control the process and the post production cleaning. System flexibility means that the foaming process can be adjusted according to chosen type of bitumen and ensures quick and efficient shifts between production of foamed bitumen and hot mix asphalt.

EFFECTIVE SERVICE KEEPS THE WHEELS RUNNING

// Turn-key Delivery and Service

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

KVM International A/S

KVM International A/S
Industrivej 24
DK 8620 Kjellerup

Phone: +45 87 702 700
Fax: +45 87 702 701
Mail: kvm@kvm.dk

KVM.COM



KVM
KVM INTERNATIONAL A/S