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• ASPHALT ADDITIVE EQUIPMENT

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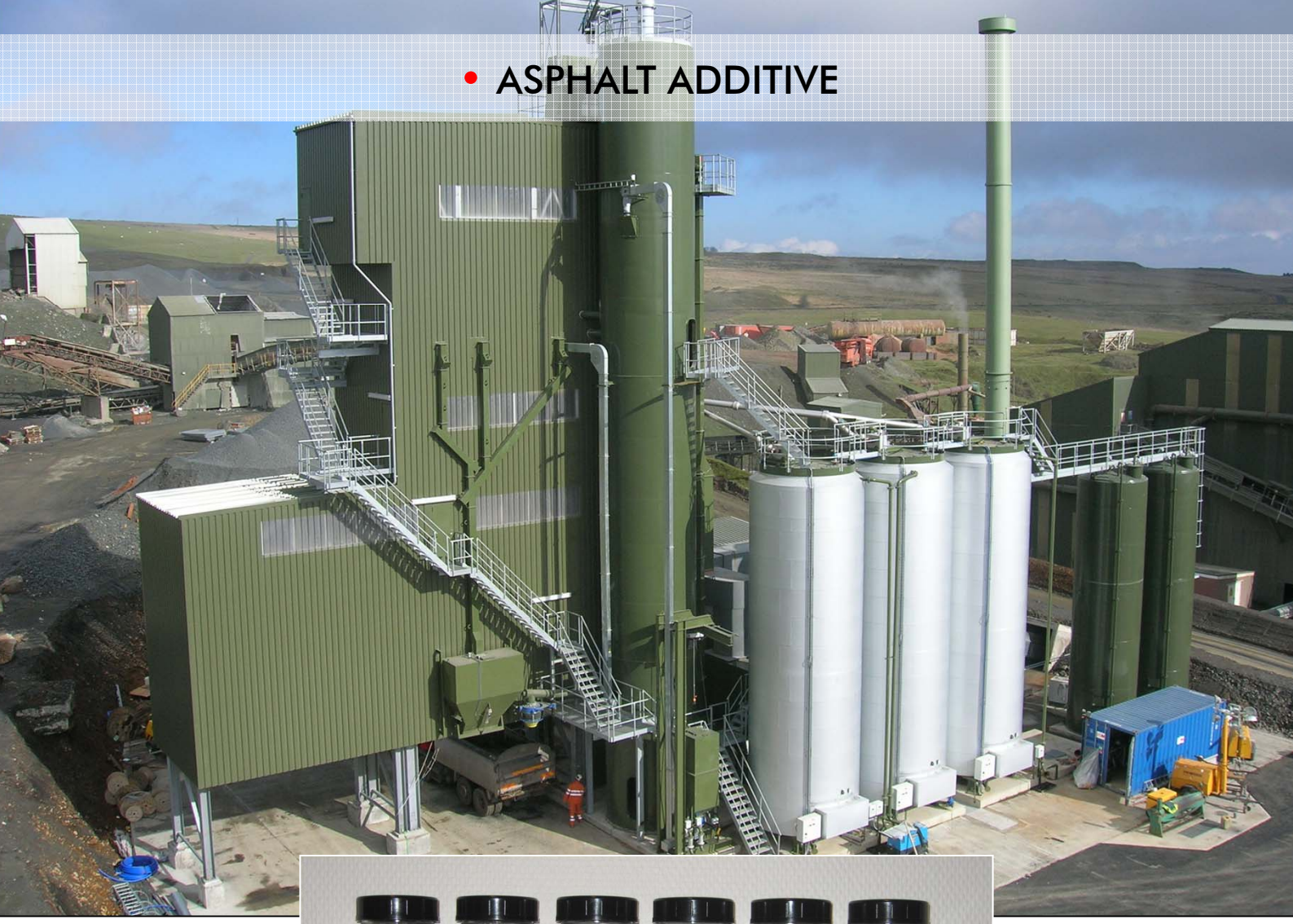

Additives – a must in modern asphalt production

Today asphalt is no longer just a bituminous mixture with different aggregate grain curves and different bitumen penetration grades. The demands for longer guarantees on the roads, asphalt strength and lower emissions during asphalt production and paving are increasing every year. The future demands a high flexibility on even the smallest asphalt plant. For lower production volumes, it is possible to add the additives manually into the mixer in small suitable bags. This is an expensive way since the additives are more expensive and one employee has to add the additives to the mixer manually - for each batch – normally every 60 seconds. In the worst case scenario an employee may miss the opportunity to add the bag. With **KVM** equipment it would be able to store and add the right amount for pellets, powder or liquids. Now the additive is added every time, because the plant control is starting the equipment in every cycle time - every batch....

The **KVM** equipment is a fully automatic handling, dosing and adding system and is highly preferable for high production volumes. **KVM** has with years of experience in adding complex additives, a wide range of handling dosing and adding equipment. Additives are often very different some are fine powders, others are large lightweight pellets, others small heavy pellets, liquids, very abrasive or sticky powders. Storage and handling are very different and often the dosing system must be specially designed to suit only one additive type. Otherwise the possibility is to buy the bitumen "ready mixed" from the bitumen supplier but then it is necessary to have at least 20 tons tank space. Most of the additives are in pellets / pills form, but some can also be delivered in liquid form.
In the following sections some of our possible dosing systems for additives will be explained.

• COLOUR / POLYMER PELLETS

Colour pellets

Adding of colour pellets is slightly different to dose than other lighter additive pellets. The density is higher – (typical 1,8 kg/ltr.), and at the same time, a large adding percentage of the batch is required. Specially if the colour pellets are used in combination with black bitumen. In some cases it is necessary to add +15% of the bitumen part and this could easily be 30-40 kg colour pellets in one batch. This demands the scale to have an increased volume, and a higher weighing area, compared to many other additives. The colour pellets are a smaller type of pellets. To handle colour the KVM pellet system includes a buffer where the elevator delivers. From the buffer a screw doses the pellets into the filler scale to weigh up, which is the ideal way. Colour can also be in powder form.

Polymer pellets

The range of pellet types is huge and their properties are very different. The form and the density is also different, so the equipment has to be designed based on the additive product.
Pellets, powder or liquid, some of the additive products can be in more than one state. Common for all products is that they have to be weighed or measured by flow, to give the right amount. Pellets / pills in Ø 2-5 mm with low density need to be stored and added dry and can be a very living material.
A flexible screw conveyor can transport the pellets / pills directly from the receiving station up to a single scale. When weighed up, a bottom gate opens, and the pellets only have to fall through a pipe and directly into the mixer.
KVM blow system is also usable for such type of pellets.

Colour	Equipment	Capacity	Power
	Receiving station	2.5 m^3	
	Rotary valve	10 m^3 / h	0.37 kW
	Elevator / flexible screw	40 m^3 / h	2.2 - 5.5 kW / 1,1 kW
	Buffer	0.3 m^3	
	Screw Ø216	16 m^3 / h	3.0 kW
	Vibrator		0.16 kW

• FIBRE / PAPER PELLETS

Fibre pellet additive system

Fibre pellets are very easy to handle, store and dose with a **KVM** pellet additive system. **KVM** dedicated fibre pellet system is designed in two versions, with possibilities for further options. The fibre pellets can be stored in free standing receiving stations placed at ground level (see illustration), or alternatively as a hanging storage system. Both of the stations are filled by big bags. A rotary valve secures the right volume in the elevator screw and the elevator brings the pellets to a single scale. The **KVM** universal pellet dosing system can handle various pellet types being used in the asphalt industry. Alternative the KVM blow system is available for pellets.

Paper fibre additive - in general

In an asphalt recipe there is a maximum limit, how much bitumen the mixture can contain before the bitumen will drain away from the aggregates. Often this is a challenge to stone mastic asphalt types, where the grain curves consist of only fine and larger aggregates. By adding paper fibres to the recipe the mixture can absorb more bitumen. The fibres are only necessary during the storage or transport of asphalt to the paving machine. After the asphalt is paved and compacted, the fibres do not have any functionality.

To give the correct amount of the dosing, the pellets are weighed up in a single scale and then screwed into the mixer.

Fibre pellets	Equipment	Capacity	Power
	Receiving station	2.5 m^3	
	Rotary valve	10 m^3 / h	0.37 kW
	Elevator	40 m^3 / h	2.2 - 5.5 kW
	Scale	40 dm^3	
	Screw Ø168	10.5 m^3 / h	1.5 kW
	Vibrator		0.16 kW

• LOOSE FIBRE

Fibre pellets vs. loose fibre performance

The disadvantage with fibre pellets is that extended dry-mix time is necessary to ensure that the pellets are crushed before the bitumen is added. Particularly with smaller size aggregates the premix time is extended. By using fibre pellets it is often necessary to overdose with +25% to ensure the correct fibre amount in the ready asphalt mixture. Loose fibres are more difficult to handle, and need a special receiving unit to pre-homogenize and store the fibre while they are kept loose with an agitator system. Loose fibres are much more effective, and can be calculated recipe wise to be 100% effective. Free fibres are often cheaper per weight, and the general saving in fibre weight is 25%.

KVM loose fibre storage and dosing system

KVM has developed a complete solution that ensures an easy daily use and handling of loose fibres from the compressed big bag to an exact amount of loose fibre in the asphalt mix. The system consists of a dust-proof receiving station for 450 kg big bags. Use the integrated hoist to lift the big bag from ground level and into the receiving compartment.

After the bag is raised into and behind the closed and sealed door, the bag will be lowered onto jigsaw cutter blades that cut the bottom of the bags fully open. A combined screw conveyor and elevator lift the fibres to the special low tare scale section. The correct amount of loose fibre is weighed up according to the recipe.

Loose fibre	Equipment	Capacity	Power
	Receiving station	2.5 m^3	
	Cutter		2 x 0.75 kW
	Agitator		5.5 kW
	Elevator	40 m^3 / h	2.2 - 5.5 kW
	Scale	200 dm^3	
	Screw Ø300	35 m^3 / h	2.2 kW

BLOWING SYSTEM

Universal pellet dosing and blowing system

The KVM universal dosing and blowing system is suitable for dosing various pellet types. The flexibility is great – from one to three receiving hoppers can be combined to use the same scale and blowing system. The receiving hoppers are developed to ensure a low design with a high volume. The hoppers can be delivered with either manual cover or with optional pneumatic operation. Under the storage hopper, a screw conveyor doses the pellets into a common scale. To secure accuracy of the scale, valve and rotary valve are covered in a steel sheeted housing to minimise wind and weather influence.

After weighing the additive pellets, a valve opens under the scale and a rotary valve ensures a stable flow of pellets into the air stream. The air stream is generated by a radial blower. The pellets are accelerated horizontally with the air stream and can be lifted more than 20 metres before they reach the cyclone separator. The cyclone separates the pellets and the air stream. The pellets fall into a small hopper, where they will be temporary stored, until a pneumatically operated valve under the hopper opens and the pellets can be added through a free gravity fall pipe into the mixer.

Blowing system	Equipment	Capacity	Power
	Silo storage	3 m^3	
	Screw Ø273	20 m^3 / h	3.0 kW
	Scale	150 dm^3	
	Rotary valve	20 m^3 / h	0.75 kW
	Blower	1,800 m^3	7.5 kW
	Buffer	150 dm^3	

• LATEX - AMINE / FLUX

KVM Latex additive system

Latex rubber is an additive to asphalt mixtures and is added to increase temperature stability.
KVM has developed a complete supply and dosing solution for accurate dosing of Latex rubber. The KVM Latex pump is a constant / linear pump, that ensures accurate dosing. After the control system reaches the pre-set rotation counts, the correct amount of Latex is added to the mix and the pump stops. After the daily use of the Latex dosing system, the pump, pipes and hoses must be cleaned with water. The water cleaning feature is integrated in the KVM Latex dosing system.
Latex is also available in pellet form.

KVM Amine / Flux oil dosing systems

Amine improves adhesiveness of the aggregates and softens the bitumen. Amine is only workable from around +40°C, so the Amine needs to be preheated in the storage tank before it can be pumped. The dosing is done via a pump through a flow-meter. Tank, pump, flow meter and the dosing pipe can be supplied with electrical heating.
Flux oil increases the workability of the asphalt by lower temperatures. Flux oil is added directly to the mixer. The KVM flux system is in principle the same as for Amine, but features a larger pump and flow meter.

Specification	Equipment	Capacity	Power
Latex	Pump	34 l / min.	1.1 kW
	Revolution counter		
Amine / Flux	Amine heated tank	1,500 litre	2 x 1.5 kW
	Amine pump	4 l / min.	0.25 kW
	Flux pump	85 l / min	1.1 kW
	Flowmeter	0.6 - 100.0 l / min.	

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