SPRAYRAKE
INNOVATION

Sprayrake Innovation Enterprise

INTRODUCES

the 5-7 Sprayrake

an innovative

water injection system

for vertical roller mills out of

1 hand...

The "5 - 7"
Sprayrake unit mounted on the
workshop display unit

- The “5 - 7” Sprayrake is a fully integrated water injection system for vertical roller mills.
- It was designed to reduce water consumption, keep the nozzle clean without clogging and to be adjustable in 5 directions.
- All parts conducting the water downstream the filter are made of stainless steel to keep rust away and to be able to use chemical grinding aid.
- The nozzle is designed to spray the water punctual into the grinding bed. Less contact with the powderized product floating on top.
- Installation needs each only a hole 18x18 cm. To stabilise the hole, a mounting frame of 12 mm thickness will be welded around the hole and the hole will be accurately covered by a rubber seal plate.
- The whole unit can be mounted by 2 persons only.
- The first package comes with 3 mounting units, 1 complete spare tube and 3 spare nozzles. The water conducting parts need no additional seals or Teflon tape. Standard tools are enough.
- The commissioning can be assisted by our process engineer. If not wanted, the installation instruction is with the package and a video presentation shows the right way for installation.

OUR SERVICE:

SPRAYRAKE
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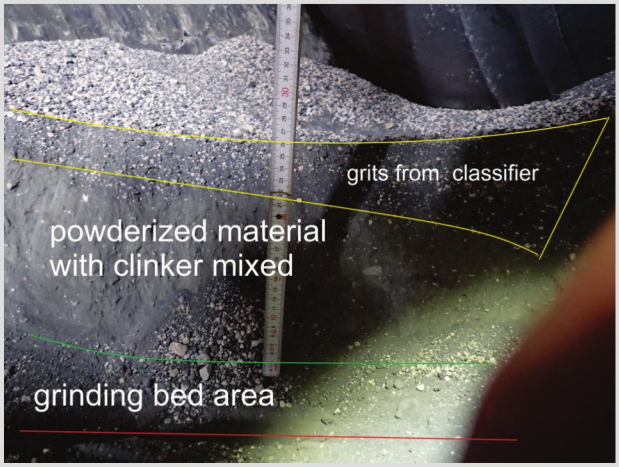
- We do optimisation of machine and process of all kinds of VRM
- We deliver customized solutions for the water injection system
- Our priority is to have units on stock. Maximum manufacturing time is 4 weeks.

SPECIFICATIONS:

- Adjustable in 5 directions.
- Total water flow from 1000-3500 l/hour for the “7 – 1,5” nozzle type (build in 3 units). Other types of nozzles are possible.
- Self-purging air vent nozzle. No more cement clogging around the nozzle head.
- Basic design for vertical roller cement mills.
- Base materials are S-275, standard API tubes and stainless steel 304.
- Wear protection easy to change
- Length of main tube 2000 or 2300 mm (or customized)
- Parts outside the mill are zinc plated
- 1 year warranty

ABOUT

the “5 - 7”
Sprayrake



Picture 2: Profile of a
grinding bed inside cement mill

The “5 - 7” Sprayrake is a modern water injection system for vertical roller mills, specially designed for grinding cement.

10 Years of experience and observation of mill process at site gave us the idea to improve the water injection system and eliminate the misbehaviour of the water spray itself and make it a maintenance friendly, time saving machine upgrade.

Clinker is a synthetic “rock” made out of components like limestone, Alumina oxide, Iron oxide and others, processed in a rotary kiln. Since every producer has a preference for certain mixtures that depends on the availability and the market price, the clinker is always different from plant to plant.

Aged storage clinker is changing its grindability significantly, so it is difficult to grind.

Our experience with vertical roller mills for clinker has shown, that the machine needs accurate adjustment of the grinding aid spraying.

Main grinding aid is water. Until today, water is mostly sprayed across the grinding bed in a broad spray pattern. As a result, there is a lot of water contact with the powderized cement swimming on top of the grinding bed. This means loss in setting time and strength during the first days. Also, if there is no free hot gas source, energy consumption is higher, since the amount of water injected is reaching up to 3 % of the production and so the water must be evaporated by hot gas again.

To understand the importance of a correct water spray, you must know the structure of a typical grinding bed inside VRM (vertical roller mill).

The picture 2 shows such a grinding bed in a profile after a crash stop. The top layer will be the grits coming back from the separator area.

Then comes the section, where the powderized material is located. During milling operation, that material floats on top of the grinding bed, and in front of the rollers.

The problem is, that standard water injection systems spray right on top of that material. Physical-Chemical reactions start immediately, and are interrupted, when the water has been evaporated by the hot gas. The more water is needed to stabilise the mill, the more loss of quality will happen.

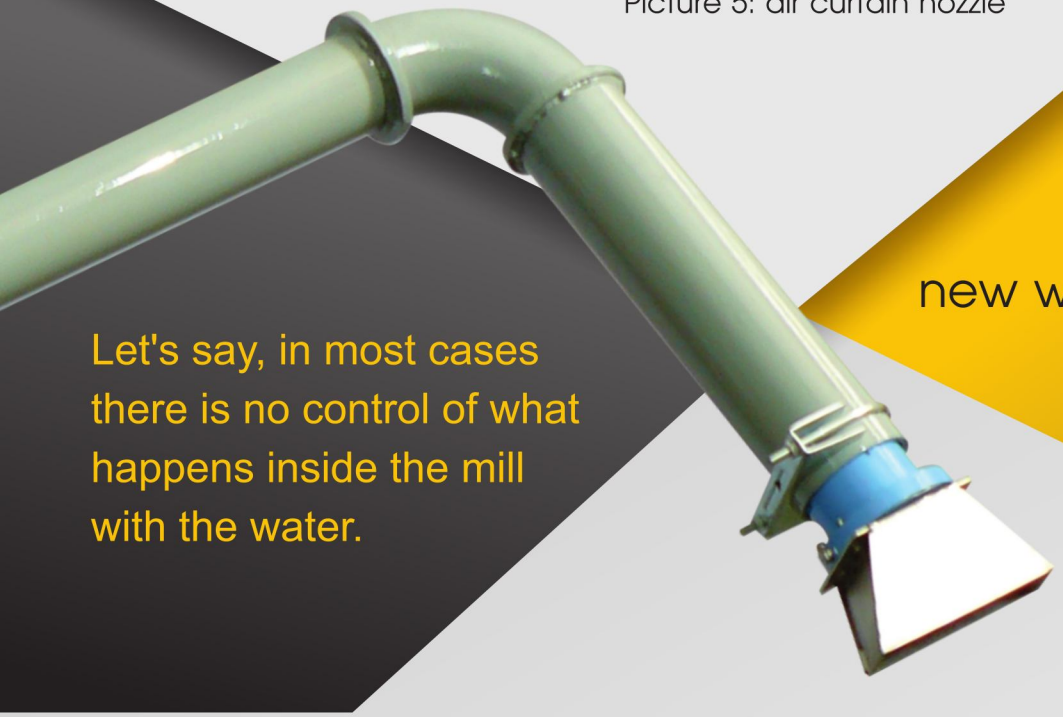
But it can get worse, when the systems are misadjusted, or worn out.

- Yielding water spray has no effect and only cools down the gas stream
- Wrong position of the water spray can “harden” the track in the wrong position and force the roller into a wrong position.
- The water sprays only on a spot, and the effect is less.
- Modified nozzles are not shaped good.
- Nozzles are leaking at the pipe joints and collect cement dust.

Picture 3 and 4:
Wrong nozzle and dust collection

And finally, some systems are not easy to take out during maintenance, have water pipes made of standard steel and are difficult to repair, since the threaded joints are inside the mill and mostly the treads are difficult to reach or spoiled already. Welding with stick electrodes can block the pipes inside completely.

Picture 5: air curtain nozzle



Let's say, in most cases there is no control of what happens inside the mill with the water.

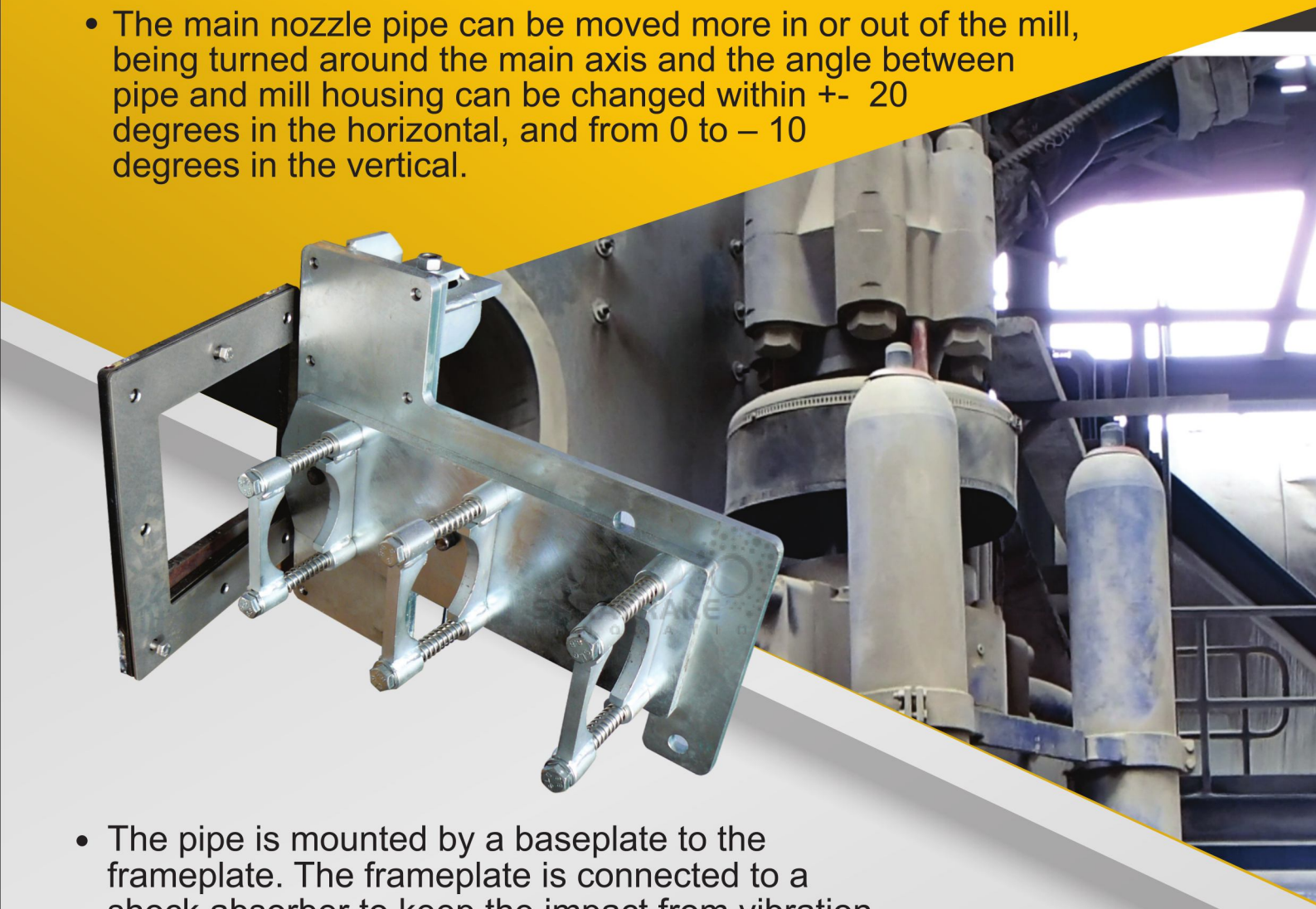
WHAT IS new with the "5 - 7" Sprayrake ?

- We call it "5 - 7", since we have the nozzle head with either 5 or 7 nozzle tubes, with 2 or 3 mm inside diameter.
- Further options are 3 nozzle tubes for very small mills.
- Like a rake with its fingers, the sprayrake sprays the water spotwise with high velocity (10-20 m/s, depending on waterflow and nozzle size) into the grinding bed.
- The water pipes downstream from the filter (mesh 1 mm) are made of stainless steel to handle grinding aid too.
- The nozzle head is connected to a flexible well-tube and can be taken out with 2 screw opening only. No seals and no Teflon tape are needed to seal the connections.
- The whole sprayarm can be taken out of the mill in 1 piece.
- The water nozzle head is hidden in an air curtain nozzle that keeps the dust away from the nozzle head and the water away from the air nozzle. No more clogging expected.

- The nozzle arm is adjustable in 5 directions to get an optimum spray position.

- The inner tube of the nozzle carrier (picture 5, blue part), can be turned and extended by loosening the clamp.

- The main nozzle pipe can be moved more in or out of the mill, being turned around the main axis and the angle between pipe and mill housing can be changed within +- 20 degrees in the horizontal, and from 0 to – 10 degrees in the vertical.



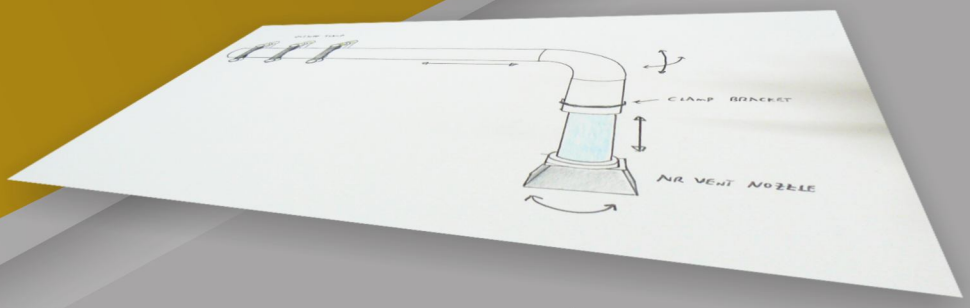
- The pipe is mounted by a baseplate to the frameplate. The frameplate is connected to a shock absorber to keep the impact from vibration away from the sprayarm.

- The shock absorber is mounted to the frame that is welded to the mill body.

- The main advantage is, that the spotwise spraying reduces the contact of the powderized material with the water. The water reached deeper into the grinding bed, where it works as bed stabiliser. The picture 2 shows, how high the material can lay on the grinding table. But the gap between the table and the roller is mostly between 20-60 mm (depending on machine size, build and material ground).

That is where the water is needed...

WE DELIVER...



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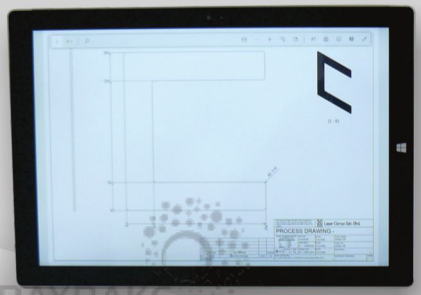

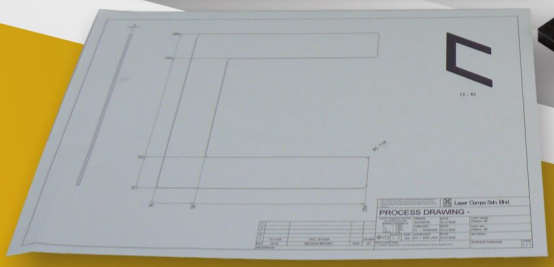

to the design ▶

◀ to production

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