ELETTA®
FLOW MONITORS

ROBUST HIGH QUALITY FLOW MONITORS

Application: Grinding aid chemical flow measurement

Grinding aid chemical flow measurement in waterproof cement production

The addition of grinding aid chemical to cement clinker is operated in a closed PID loop, before it reaches the mill for chrushing. The chemical dispensing depends on clinker weight on the conveyer belt. More the clinker, more the RPM of dispensing pump is increased to add more chemical.

Media details & operating parameters toward flow meter selection :

Media : Grinding aid chemical liquid. (Chemical properties are not know).
Media viscosity: < 20 mPa_s at 25°C
Media density: 0.95 gm/cm3 (25°C)
Pump max flow rate: 1.5 LPM
Normal flow rate in LPM: 0.8 LPM
Max temperature: 30°C
Operating pressure : Below 100 mbar
Stored in 1000 Litres Plastic tanks.

Challenges in flow measurement :
Earlier this grinding aid chemical used to be conductive liquid, but for waterproof cement production, a new type of grinding aid chemical has been introduced, which is non-conductive by inature. So existing Electromagnetic flow meter at Grinding aid chemical dispensing skid are not able to sense this grinding aid chemical flow in pipe-line. Operating flow & Operating line pressure are also very low in given pipeline.

Possible Flow measuring techniques & their limitations:

1 Electromagnetic flow meter: It operates on Faraday's law & is an economical, best suitable flow measuring technique for conductive liquids flow measurement.
These type of flow meter are suitable for liquid flow measurement having conductivity more than 20 micro siemens. Electromagnetic flow meters are commonly used for water flow measurements in industry.

Suitability of Electromagnetic flow meter for Grinding aid chemical flow measurement of waterproof cement : Not suitable for new grinding aid chemical that is non conductive in nature.

2 Oval Gear type flow meter.
The oval gear flow meter comprises oval-shaped, geared rotors which rotate within a housing of specified geometry & read liquid flow that passes through this oval gear construction.

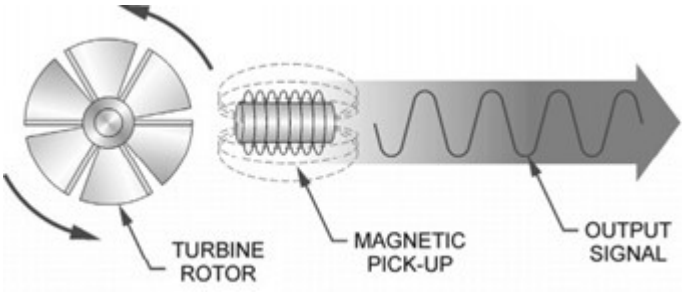
In existing chemical dispensing skid, Mag meters were replaced by an Oval Gear type flow meter of 10mm size, but that did not work either.

Referring to the end user feedback, internal construction of Oval Gear flow meter gets chocked & it stops reading flow due to internal blocking. They opened the flow meter & found that being a rather small size flow meters of DN10, very small size oval gears are deployed and due to friction with chemical & third party partials present in the media, they are facing a frequent chocking in pipe line. Finally the end user had to remove this oval dear from pipe existing even though it's remote indicator is still hanging near to skid. Please refer to photograph.

Suitability for Grinding aid chemical flow measurement: Not suitable for new grinding aid chemical flow measurement.

3 Turbine type flow meter.

Turbine flowmeters works by using the energy of the fluid passing through it to move a rotor within the water or other fluid passing through. There are blades on this rotor, which are angled in such a way so they use the fluid to create a rotation, and move the rotor around in a clockwise or anti-clockwise motion.



For better flow measuring results, Turbine flow meter are recommended to use for liquid flow measurement having viscosity less than 10 Cst. However here the grinding aid chemical´s viscosity is around 20 Cst so it is not suitable.

Operating pressure & flow rate are very low & even 6mm turbine flow meter does not suit to measure required operating flow rate.

4 Engineered orifice with DP transmitter.

It is a conventional way of measuring liquid flow in pipe line. It is not a flow meter produced, tested & calibrated on a test rig against a master flow meter in factory. It is an engineered solution & a combination of various parts like (i) an orifice, (ii) impulse pipe lines, (iii) 5 Way manifold, (iv) DP transmitter.

As stated above, these type of engineered solutions are not calibrated against any master so flow measuring accuracy out of this system is always doubtful. In general accuracy of flow measuring results lies between 7 to 10 % of flow range.

This flow measuring system offers a small flow measuring span with flow measuring turn down ratio of 1:3 or 1:4 only. This system is not recommended for low operating flow rate at low line pressure in a closed PID controlling loop, which is exactly the situation here in this application.

Eletta M series flow meter.

One unit of Eletta M Series flow meter (M310-G15BR) was supplied & installed at this application in a Cement Plant for Grinding aid chemical flow measuring application for a free trial run.

Addition to media flow, Eletta M series flow meter sense Line Pressure, Line temp & over MODBUS communication, it yields Line Pressure, Line temp & Flow rate outputs. After preliminary testing at Laptop, Flow meter was connected to plant SCADA, It was working fine & end user team kept it for observation for 15 days.

Grinding Aid Chemical was flowing @ 0.6-0.7 LPM & flow rate was also verified by volumetric collection by end user team. Operating Pressure was found to be as low as **70 mBar** & temp @35 DegC. Green circle show Eletta M series installation in chemical dispensing skid.

Now end user team is looking for confirmation from Grinding aid chemical supplier on it's suitability with Brass & Nitrile rubber parts so that we can use the economical version of Eletta M Series flow meter.

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