PAM products are hygroscopic

In latitudes with low temperatures and low humidity, i.e. below 35°C (95°F) and below 50% humidity in average, this is not a major issue, even if there may be sticky agglomerates sometimes.

But when temperatures rise above 35°C (95°F) and humidity above 60-70%, agglomeration and pipe blockage become a real problem.

There are two techniques using pneumatic transfer for PAM powders:

- To use compressed air at 6-8 bars that has been previously dried with silica down to a dew point below -20°C (4°F). And then reducing the pressure to 1-2 bars for the powder transport. But drying air at low temperatures is very difficult.

- To use either compressed air or a Roots at temperatures such that humidity falls below 50%. The ideal would be 30°C, unfortunately in many cases this auto generated air temperature is above 100°C, and it is necessary to use an air heat exchanger to reduce it to around 80°C. Fortunately the contact time between air and product is short enough not to cross link the polymer.

In any case it is also necessary to blanket the silo with dry air in order to prevent outside humid air from caking the silo walls.

Recommended Methods

For large volumes
Pressurised loading pod or Rotary valve

For small volumes
Eductor

Avoid all suction type equipment

There are several pneumatic transport techniques:

Concentrated pneumatic transport
The product is loaded in a pod and pushed by air into the silo. The amount of air necessary for transport is low and the caking problem is less serious.

Transport with an air eductor
The air is generated normally by a Roots or by a fan at 1 bar. Due to compression the air is around 100°C which brings the humidity down. Air suction with the powder reduces the temperature down to 70-80°C, which can be often acceptable, eliminating the need for any further air treatment.

Rotary Valve loading with compressed air
A rotary valve loading of the powder does not add air. Therefore the compressed air needs to be cooled to about 80°C before pneumatic transport.

Suction
This is the worst case as the PAM powder is directly in contact with the humid outside air and generates practically always problems of blockage of the transport pipe.