



APTECH DRY AIR STORAGE & CONVEYING SYSTEMS

Aptech (Powder Systems) Limited

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PNEUMATIC CONVEYING

ADVANCES IN PNEUMATIC CONVEYING

Advances in pneumatic conveying over the last 20 years has meant that systems have become much more efficient and reliable. Applications and products thought previously unsuitable have now become viable.

The complex flow phenomena of solids and gases means that high levels of skill and experience are required to design efficient and complex systems.

New technology has made available sophisticated, reliable and economical tools to designers to help them achieve better results. Computerised design programmes enabling complex calculations, modelling and scaling can be used to predict performance and specify equipment. Advanced control devices are now available to ensure a system will operate reliably within critical design parameters.

Products can be conveyed at lower and controlled velocities to prevent product damage, reduce wear and abrasion and reduce power consumption.

Monitoring and controlling - the product being conveyed; the conveying system; and the equipment; means blockages, faults and failures can be avoided.

Controlling the conveying medium and environment such as gas flow, humidity, temperature, velocity and pressure means hygroscopic, friable, perishable & hazardous products can be conveyed.

Many products have characteristics which present problems when stored and conveyed.

Conditions such as particle degradation, cohesion, caking, agglomeration, static, humidity, micro-biological growth, dust explosion, attrition, abrasion, fluidisation, segregation, mass flow/core flow feeding, are all factors which can effect the performance of a pneumatic conveying system and the products conveyed.

A better understanding of these conditions enables designers to develop advanced solutions to overcome problems associated with these factors.

PNEUMATIC CONVEYING

CLOSED LOOP DRY AIR CONVEYING

Storage & Transportation of Hygroscopic & Perishable Products in a Dry Sealed System.

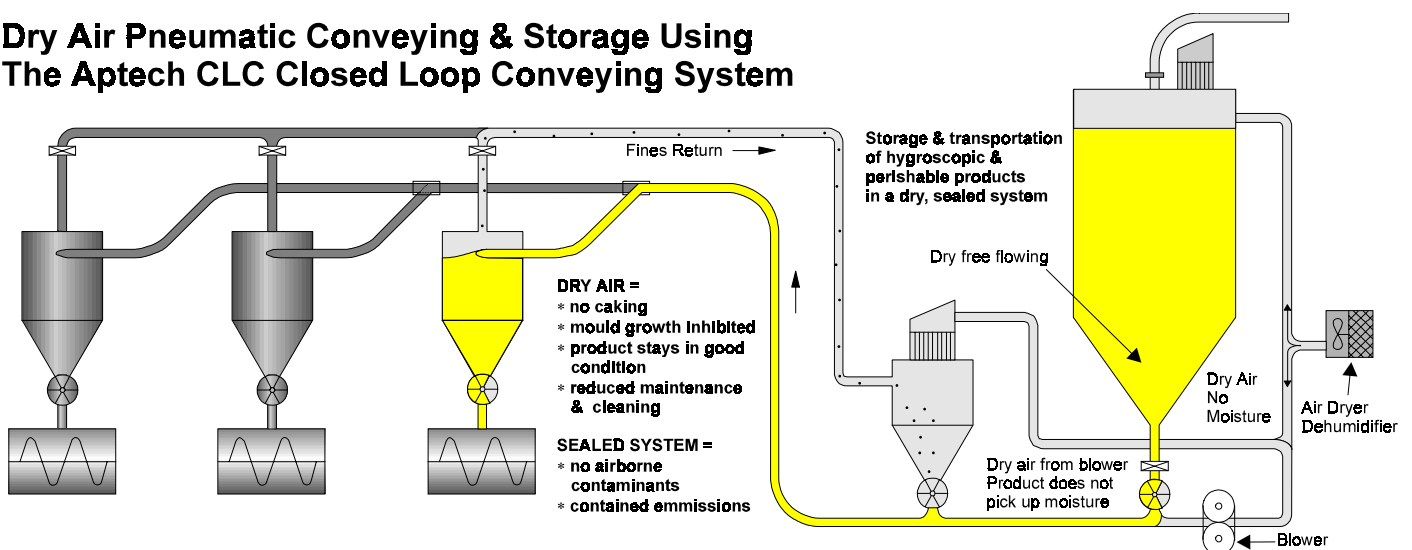
Dry Air =

- no caking/agglomerating
- microbiological growth inhibited
- product stays in good condition dry & free flowing
- reduced maintenance & cleaning
- no condensation or need to lag/insulate pipes
- improved filter performance

Nitrogen conveying =

- Hazardous products transported safely
- Explosion panels and venting eliminated
- Economic conveying by recirculation

Dry Air Pneumatic Conveying & Storage Using The Aptech CLC Closed Loop Conveying System



PNEUMATIC CONVEYING

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Many bulk food ingredients such as sugar, cocoa, milk/whey powder, egg powder, malt, starch and flavourings are Hygroscopic and will readily take on moisture from atmosphere.

Storing these materials in silos and hoppers and conveying to a process often means that the materials are exposed to ambient air conditions. This can lead to caking, agglomerating, build up in hoppers and chutes and mould growth.

Fluctuating temperatures such as day time and night time or outdoor and indoor temperatures causes moisture to condense out of the air on to walls or product.

The European average Relative Humidity (RH) is approximately 80% and a RH of 65% or higher will often cause bacterial/mould growth.

Humid air can enter the system through truck/railcar blowers during unloading, silo vents, pulse jet filters, aeration systems, fans/blowers from pneumatic conveying systems and open process systems.

Controlling the environment in which hygroscopic products are stored, conveyed and handled in will eliminate the problems of blockages, agglomerating and mould growth. Controlling the humidity conditions will ensure the product is kept to a high quality, free flowing and maintain hygienic conditions. Incorporating air driers or de-humidifiers into a system will effectively remove excess moisture from the handling process to give the required conditions.

Drying large volumes of air can be expensive so it is important to minimise losses and re-circulate wherever possible. Sealed Closed Loop Systems are an effective way of providing an economic re-circulating air system. Being a sealed system other benefits include no spillage, dust emissions or losses.

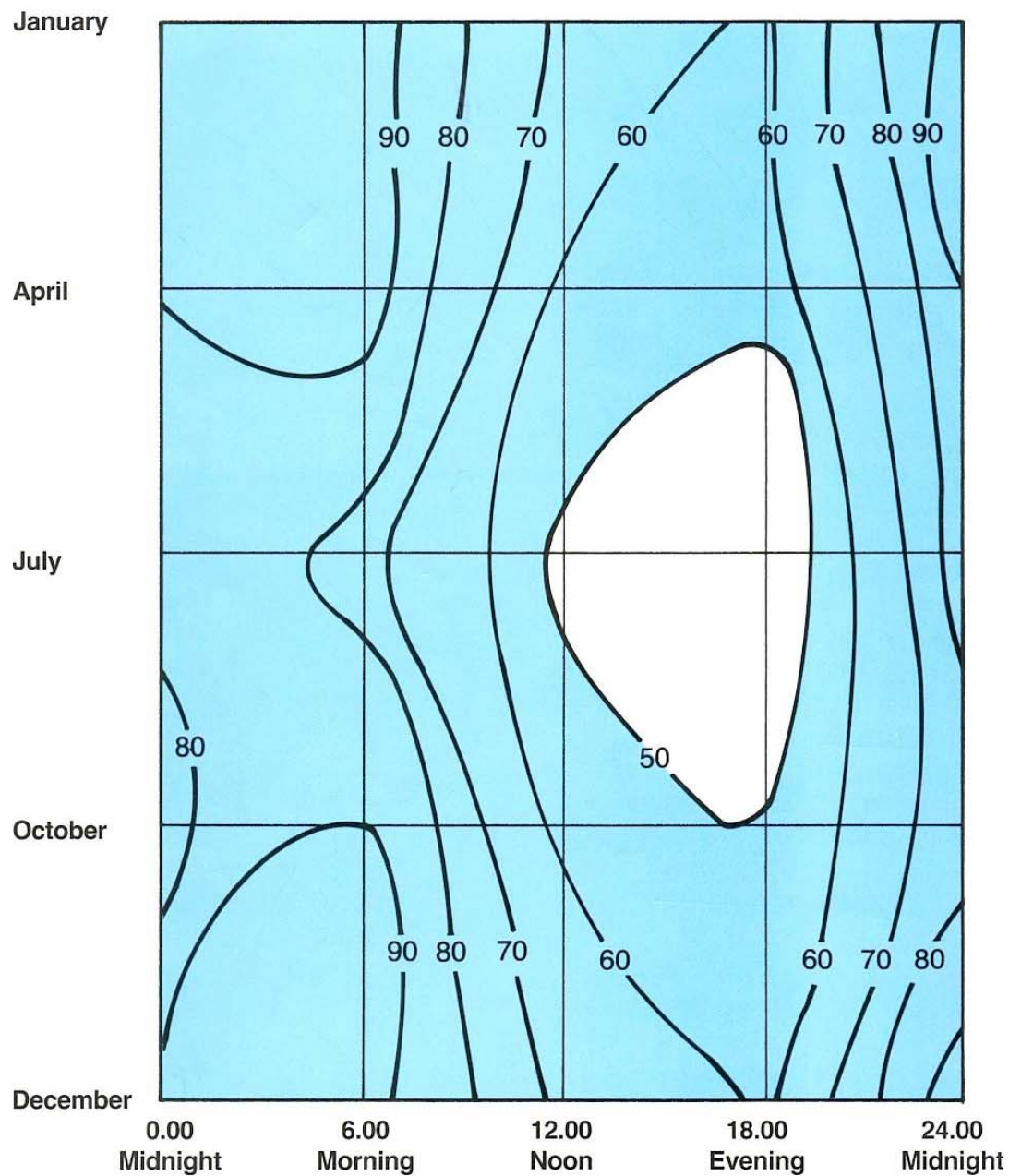
The technical and economic benefits of closed loop conveying and storage have been realised by many diverse companies and to date Aptech have designed and installed more than 200 closed loop conveying systems throughout the UK and Europe. With this wealth of experience Aptech have become market leaders in closed loop storage and conveying technology and are able to offer the most economic and technically advanced solution.

DRY AIR STORAGE & CONVEYING

EFFECTS OF HUMIDITY & TEMPERATURE ON STORAGE

OUTDOOR AIR HUMIDITY (RELATIVE %)

Typical Annual Conditions (London).

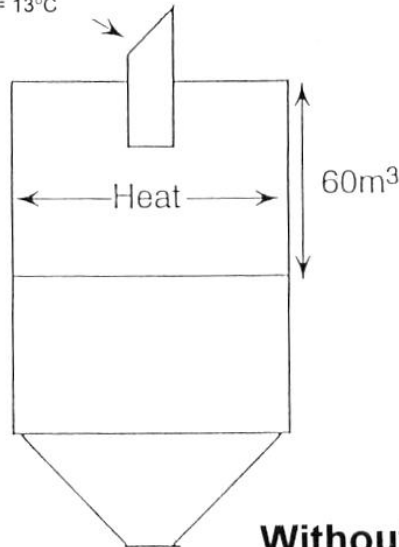


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EFFECTS OF HUMIDITY & TEMPERATURE ON STORAGE

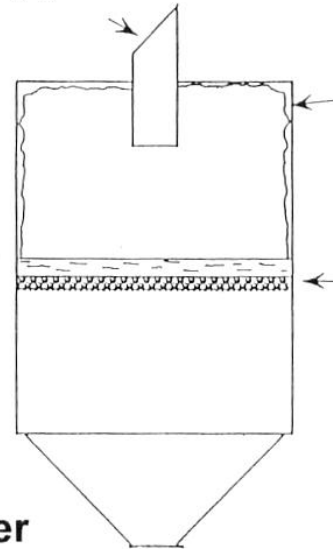
Day/Summertime

21°C @ 60% RH = 9.4g/kg moisture content
Dew point = 13°C



Night Time

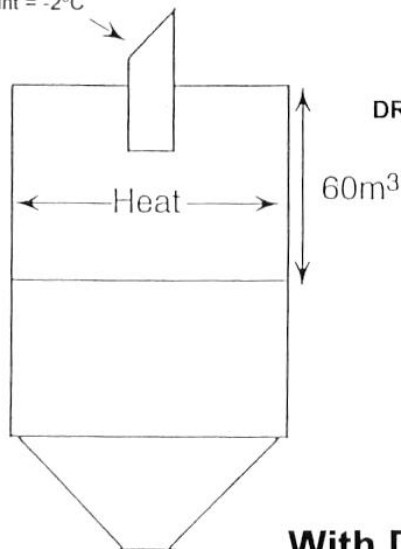
Temperature drop to 5°C @ 100%RH = 5.4g/kg
4g/kg moisture will result in condensation



Without Drier

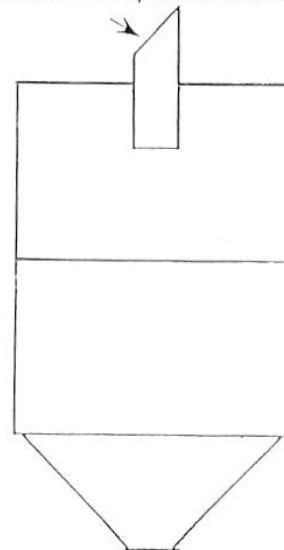
Day/Summertime

Drier removes 5g/kg = 4.4g/kg moisture content
Dew point = -2°C



Night Time

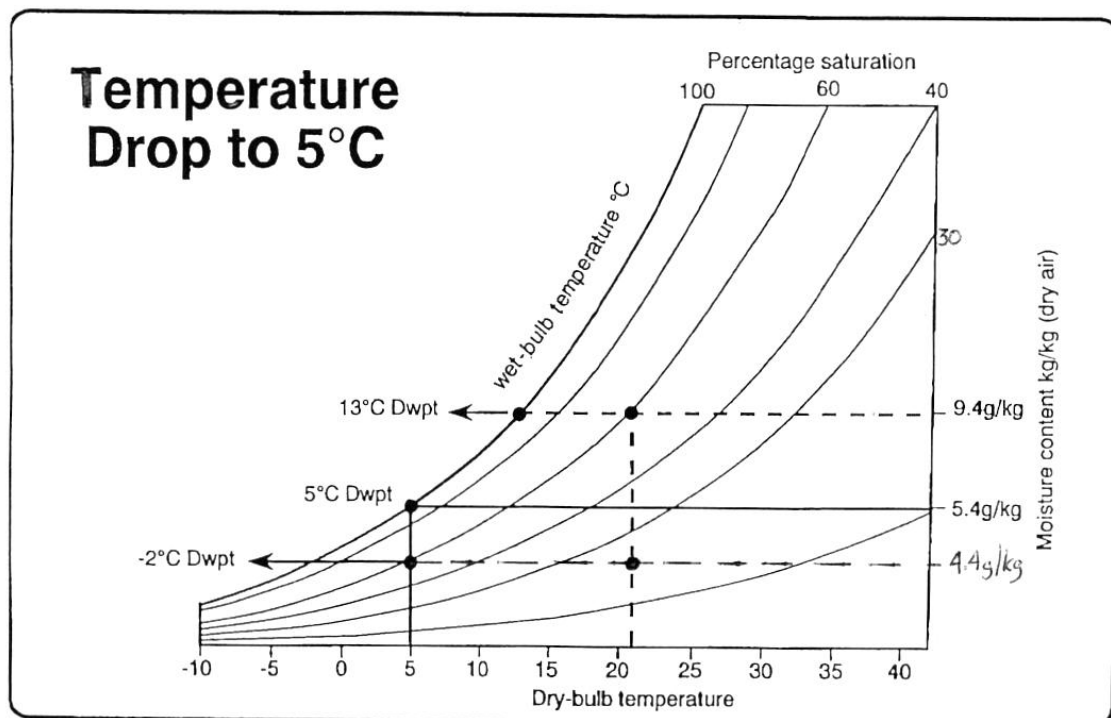
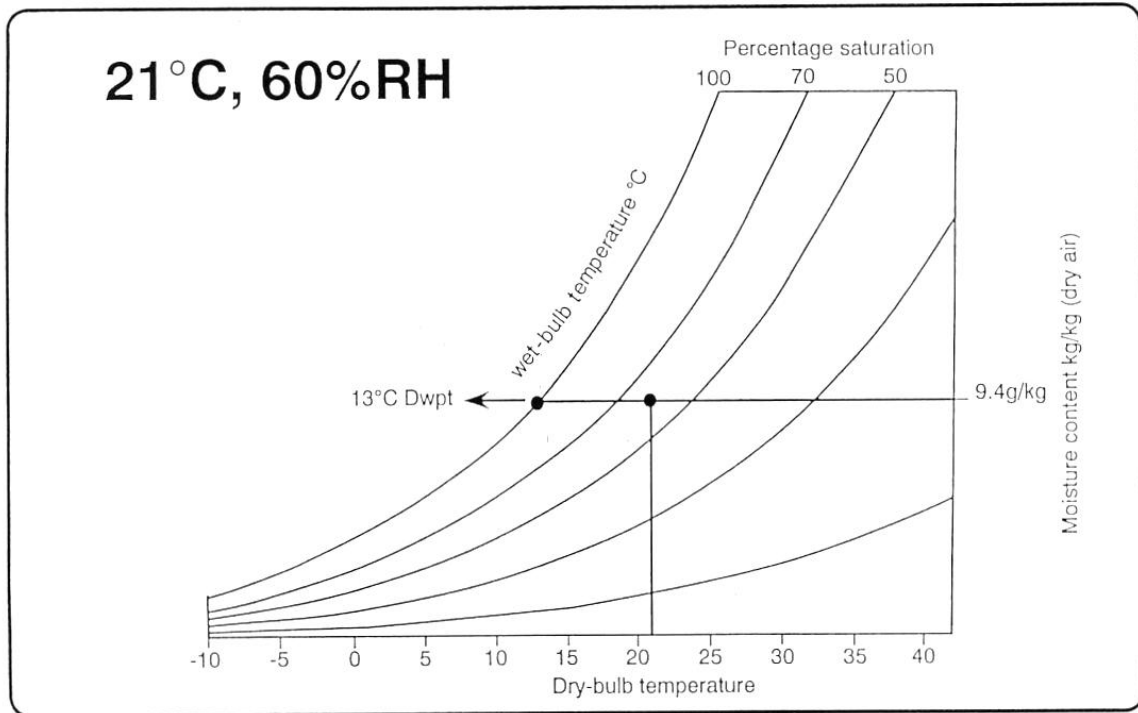
Temperature drop to 5°C
5°C @ 100 RH = 5.4g/kg
No moisture will drop out no condensation



With Drier

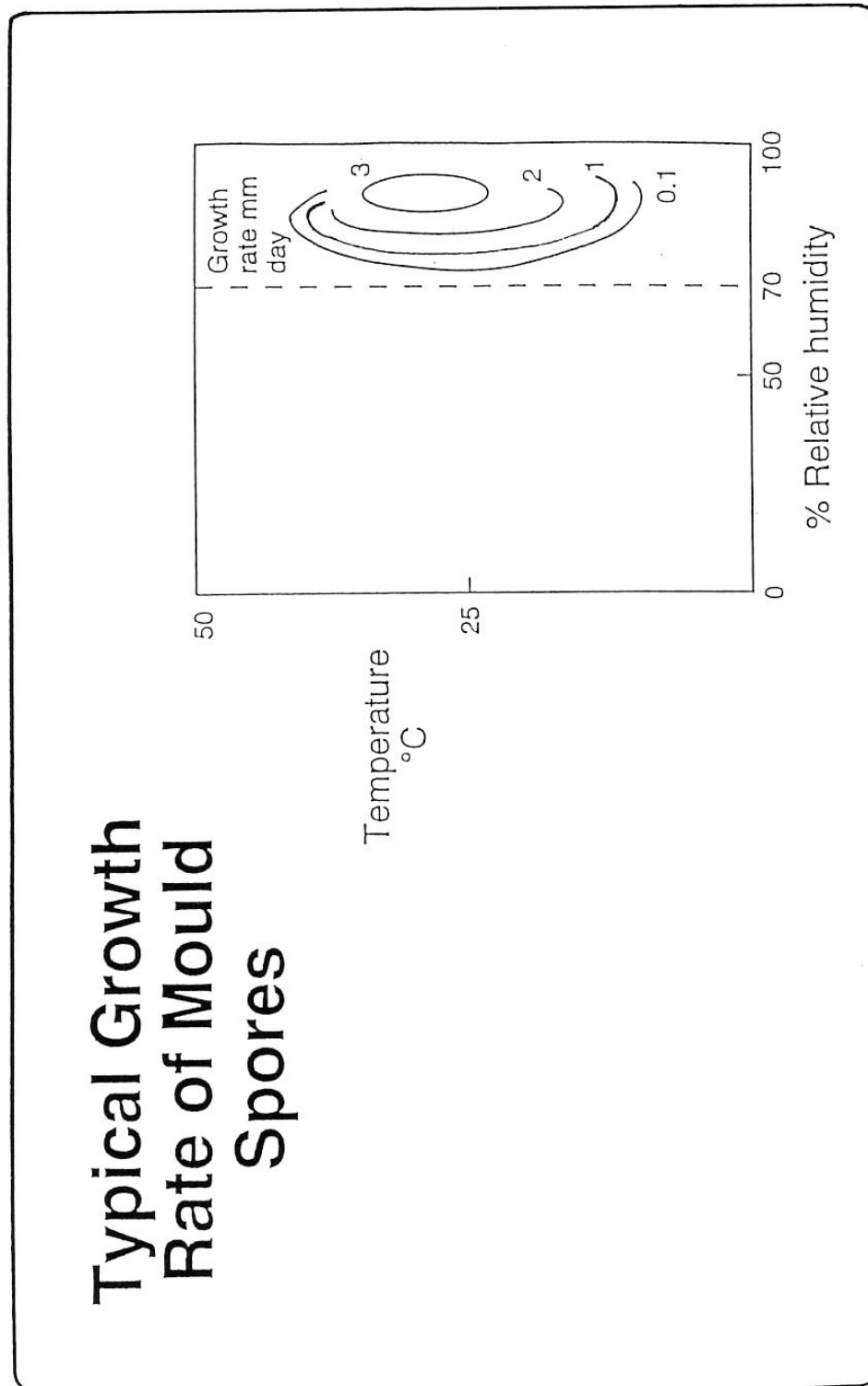
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