PNEUMATIC CONVEYING OF FRAGILE PRODUCTS

Aptech's 'Closed Loop Conveying' and 'Air Speed Control' System is an Economical and Effective Way to Prevent Excess Damage to Fragile and Hygroscopic Products.

APTECH'S UNIQUE CLOSED LOOP CONVEYING SYSTEM AND AIR SPEED CONTROL

LOW VELOCITY REDUCES PRODUCT DAMAGE - CLOSED LOOP ENSURES CLEAN TRANSFER

Why tolerate product breakage and waste, when with careful design this can be avoided? Van Veen of Zwartebroek, Holland, take waste bread, then crumble, dry mill and grade it to produce breadcrumbs for food coatings. They liked the idea of the Aptech CLC Closed Loop Pneumatic Conveying System, but were worried about breakage during transfer.

Aptech have supplied several pneumatic conveying systems for rusk, which is a harder biscuit like product, but dried bread is very light and friable. Tests were conducted at Aptech with all grades of breadcrumbs. It was found that the larger lighter particles (<5mm) were damaged more easily, but could be conveyed at the lowest velocities, while the smaller (<2mm) particles were more durable, but needed higher conveying velocities.

Following their trials Aptech's solution was to design a system which gave minimum velocity for each product under all conditions of conveying rate and distances minimising product damage.

Two systems were installed both being based on the unique Aptech pneumatic Closed Loop Conveying (CLC) method. This system uses a multi-stage blower to circulate air and convey product in a sealed circuit of pipe and by maintaining a constant back pressure on the fan, a CONSTANT AIR VELOCITY is achieved.

The first system conveys from the outlet of the drier to a cyclone above a multi-deck sieve. Oversized product passes through a mill back into the conveying line. The conveying rate changes depending on the grade being produced up to a maximum rate of 3300 kg/hour.

The second system conveys at a maximum rate of 2800 kg/hour to a packing bin, or six bulk outloading silos which are fitted with a simple three-way diverter to direct product. For both systems fines carried in the return air is separated in a high efficiency cyclone

Conventional pneumatic conveying systems have always incorporated bag filters which have the inherent problem of withholding product and dumping on subsequent batches causing cross contamination. The main advantage of the Aptech CLC system is that no bag filters are used thus ensuring cross contamination is kept to the absolute minimum.

The illustration above is a typical arrangement of a CLC Controlled Air Speed Conveying System. The air speed controller is placed between the blower outlet and the pick-up point. It measures actual air speed and automatically adjusts and maintains velocities according to pre-set limits. A controller indicating air speed is mounted on the panel front and velocity is easily adjusted by pressing the UP / DOWN arrows. Pre-determined velocities are set for each grade of product.

The same CLC System is uniquely adaptable for the conveying of food and hygroscopic products.

The system operates as a closed loop and there is very little exchange of air with the atmosphere. By maintaining the whole system above atmospheric pressure and ensuring the small amount of make up air passes through a desiccant drier, the conveying media is dry and sterile. This offers distinct benefits:- hygroscopic and perishable products are conveyed in a dry sealed system; mould growth is inhibited; no caking; and no cross contamination from dumping off filter bags.

READCRUMBS SIEVE TESTS
Results for 100gm samples before and after conveying

Grade	Aperture mm	>2.8	2.0 - 2.8	1.4 - 2.0	1.0 - 1.4	0.63 - 1.0	0.3 - 0.63
NOT GROUND	Before	96.1	0.9	0.4	0.3	0.3	2.0
	After	87.9	1.95	2.2	1.9	2.2	3.55
5mm	Before	28.5	21.2	16.5	4.4	8.4	20.7
	After	22.2	23.1	18.55	10.2	9.25	16.75
3mm	Before	0.5	21.2	25.3	16.0	16.3	20.7
	After	0.3	18.6	26.3	16.5	17.4	21.0
2mm	Before	-	0.1	5.1	25.4	24.1	45.3
	After	-	0.1	3.7	22.5	25.4	48.3

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