SOLIDS
PNEUMATIC CONVEYING SYSTEMS

Proven pressure and vacuum conveying for every challenge

HOSOKAWA MICRON

HOSOKAWA
SOLIDS

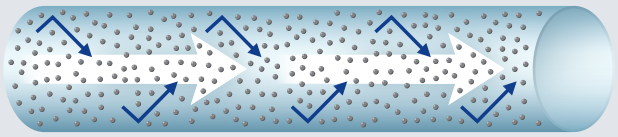
PROVEN AND MATURED

Pneumatic conveying systems of Hosokawa Solids

In the industry, the task of conveying technology is to transfer the material to the right place in the production or warehouse, where it is needed. People can find the conveying technology everywhere in the production. To solve the problems of material flow is an important task during planning a production plant.

Every material has its own special requirements for the conveying system. To meet these requirements, we offer our customers nine well-proven and matured systems for pressure and vacuum conveying with components manufactured by ourselves. In this way, we always find a suitable solution for every product and every specific task.

Your bulk solids. Our solution.



SOLIDS FLY PNEU

Dilute phase conveying

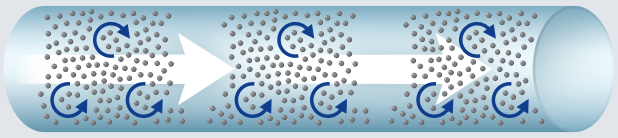
Classic dilute phase conveying system for suction and pressure operation. Particles and particle clouds or strands are carried by the air flow.

ADVANTAGES

- Easy construction, reliable and low-maintenance
- Long tool life, depending on wall and bulk good pairing
- Cost-effective

SUITABLE FOR

Flour, grain, semolina, dusts, chips, powder



SOLIDS STEP PNEU

Push conveying

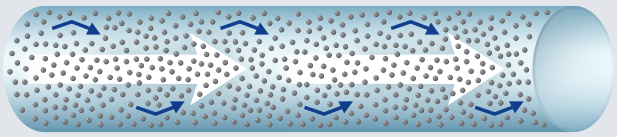
Pressure conveying system: With indicated plug formation. Grainy products with narrow grain spectrum are streamed and “pushed” as pillars or plugs. The plug flow is indicated by air impulses.

ADVANTAGES

- Gentle, low-wear conveying
- Low running costs
- Easy, robust and matured construction

SUITABLE FOR

Sands, granules, ash, nuts, peas, beans, activated carbon, pills, pastilles, coffee beans



SOLIDS FLUID PNEU

Dense phase pressure conveying

Pressure or suction conveying system: Fluidized powders are conveyed as a homogeneous mixture of material and air by using thrust force.

ADVANTAGES

- Proven, maintenance friendly construction
- Low conveying gas consumption
- Cost-effective

SUITABLE FOR

Cement, limestone powder, flue ash, bentonite, quicklime, hydrate lime, PVC, absorbent, powders, terephtalic acid, chlak

SOLIDS VACU FILL

Dense phase-vacuum batch conveying

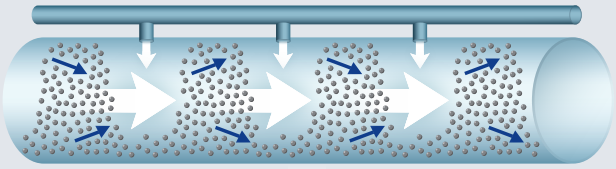
Suction conveying system: The products are conveyed in a fluidized manner or streamed by using suction power.

ADVANTAGES

- Low overall height at the feeding point
- Versatile and cost-effective solution for short conveying distance

SUITABLE FOR

Dusts, synthetical granules, fibers, minerals, flours, semolina, food granules



SOLIDS SPLIT PNEU

Dense phase conveying with bypass

Nozzles or boosters are used to dissolve the long plugs to avoid the difficult blockages of bulk materials.

ADVANTAGES

- Suitable for difficult bulk goods

SUITABLE FOR

Minerals, titanium dioxide, metal oxides, chlak, milk powder, pasten-PVC, dust carbon black, lead oxide, metal powder

SOLIDS VACU DENSE

Vacuum plug conveying with impulse valve and pressure bypass

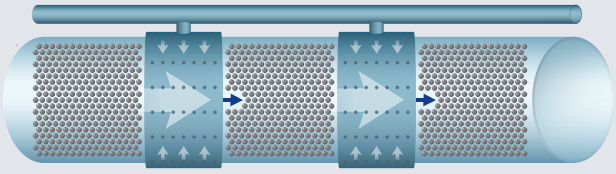
Bypass-system, vacuum-suction conveying system:
For slow and gentle suction conveying. Full pipe system.

ADVANTAGES

- Low overall height at the feeding point
- Segregation-free conveying due to stable product plugs in the conveying line
- Gentle transport of sensitive products with low conveying speed

SUITABLE FOR

Spray granules, instant products, hard minerals, milk powder, sand, granules, ash, legumes, flakes, chips, pelletised carbon black, adipic acid, metal powder



SOLIDS PULS PNEU

Low velocity conveying with secondary line (bypass system), impulse valve and relay stations (slow pressure conveying system)

Plugs are generated and preserved and pushed through the conveying line. Gentlest low velocity conveying system for sensitive and abrasive products. Full pipe system.

ADVANTAGES

- Segregation-free conveying through stable product plugs in the conveying line
- Gentle transport for sensitive products thanks to the low conveying speed
- Low-wear conveying system through low conveying speed, pure linear movement of the material plugs
- Possibility to start up a filled conveying line after a power or pressure air failure

SUITABLE FOR

Sugar, spray granules, instant products, milk powder, carbon silicide, abradants, hard minerals, sodium percarbonate, instant coffee, adipic acid, pelletised carbon black, flakes, chips

SOLIDS VIBRO PULS PNEU

Plug conveying with secondary line (bypass-system), impulse valve and relay stations (pressure conveying system)

Non-flowing products are brought out through vibration and pressure in the conveying line. Plugs are generated and preserved and pushed through the conveying line segregation-freely.

ADVANTAGES

- Segregation-free conveying through stable product plugs in the conveying line
- Gentle transport of sensitive products thanks to the low conveying speed
- Low-wear conveying system through low conveying speed, pure linear movement of the material plugs
- Possibility to start up a filled conveying line after a power or pressure air failure

SUITABLE FOR

Damp sand, centrifugal damp solids, cohesive products, mixtures, convenience blends, dry plaster, recycling-material, shreds, carbon, coke

SOLIDS TRUCK DISCHARGE

Plug conveying with secondary line (bypass-system), impulse valve and relay stations (pressure conveying system)

Like Solids Puls Pneu by using the silo vehicle as a pressure vessel.

ADVANTAGES

- Advantages of the Puls Pneu conveying process
- Allows truck unloading over longer lines
- Allows truck unloading with conditioned conveying air (dry air)

SUITABLE FOR

Sugar, spray granules, instant products, milk powder, carbon silicide, abradants, hard minerals, sodium percarbonate, instant coffee, adipic acid, pelletised carbon black, flakes, chips

Solids Puls Pneu

UNIQUE PLUG CONVEYING

Already in 1970, HOSOKAWA solids developed a complete procedure for pneumatic plug conveying. So far, more than 1,000 systems for thousands of different products are planned and built according to this concept in all the countries of Europe, the USA, Japan and India. It features an impulse valve to form plugs and a secondary line with so-called relay stations to keep the plugs and continue their transport without dissolving them.

OUTSTANDING PROPERTIES

- Practically unlimited conveying ways and conveying capacity
- No clogging at low speed and high loading
- Slow conveying and gentle conveying from approx. 0,5 m/sec
- Almost wear-free even for extremely hard and abrasive bulk materials such as silicon carbide or abrasives
- Almost no grain destruction and minimal abrasion of highly sensitive products such as spray granules
- No segregation in mixtures and processed masses
- Low energy costs through efficient use of pressure energy
- Functionally reliable even with moist, kohasive, sticky, not lowable bulk goods

ALL PNEUMATIC CONVEYING SYSTEMS IN COMPARISON

	UNDERPRESSURE *up to bar (abs.)*	***OVERPRESSURE*** *up to bar (abs.)*	***GRAIN SIZE*** *from – to (mm)*	***SPEED*** *start – end (m/sec)*	***LOADING µ*** *(kg/product) : (kg/air)*
SOLIDS FLY PNEU	0.5	2.5	0.0005 – 20	product 12 – 36, air 15 – 45	up to approx. 10
SOLIDS FLUID PNEU	0.2	4.0	0.01 – 1	product 3 – 15, air 5 – 20	15 – 30
SOLIDS VACU FILL	0.2	–	0.01 – 5	product 1 – 15, air 3 – 20	15 – 30
SOLIDS STEP PNEU	–	6.0	1 – 10	product 0.5 – 10, air 1 – 15	20 – 40
SOLIDS SPLIT PNEU	–	4.0	0.001 – 1	product 3 – 15, air 5 – 20	15 – 40
SOLIDS VACU DENSE	0.2	–	0.001 – 5	product 0.5 – 10, air 2 – 15	20 – 40
SOLIDS PULS PNEU	–	5.0	0.001 – 10	product 0.5 – 6, air 1 – 9	20 – 60
SOLIDS VIBRO PULS PNEU	–	5.0	0.0005 – 20	product 0.5 – 10, air 1 – 15	20 – 100
SOLIDS TRUCK DISCHARGE	–	3.0	0.01 – 10	product 0.5 – 6, air 1 – 9	20 – 60

ANALYSIS OF BULK SOLIDS

This is how we choose the right funding process for you

The different bulk material properties are the keys to choose the right conveying method. Therefore, it's very necessary to have the comprehensive knowledge of the bulk material properties which can be determined through an analysis of bulk material.

The bulk goods are considered according to their fluidization and air holding capacity or according to their flowability and discharging behavior. The general task and the specific requirements are also important such as the preservation of product properties, grain, volume, bulk weight, low-contamination wear behavior, etc.

YOUR BULK SOLIDS. OUR ANALYSIS.

You want to know which is the right solution for you?

Please contact us!

First of all, the analysis of the bulk goods to be conveyed is required for choosing the suitable process or components.

GROUPING ACC. TO GELDART

Geldart divides the bulk materials into groups A, B, C, D according to their fluidization behavior and air holding capacity and thus provides a rough outline of conveying behavior.

- **A** fine-grained, low-density powder, easy to fluidize with good air holding capacity
- **B** medium granules, medium density, fluidizable with poor air holding capacity
- **C** fine powders of higher density, cohesive, difficult to fluidize with poor air holding capacity
- **D** coarse granules of higher density, not fluidizable, no air holding capacity

GROUPING ACC. TO JENIKE

Jenike describes the flowability of bulk materials using the flow function FFC and thus provides a rough outline of the discharging behavior from tanks. He distinguishes as follows:

Free flowing	$10 \leq FFC < \infty$
Fluently	$4 \leq FFC < 10$
Cohesive	$2 \leq FFC < 4$
Very cohesive	$1 \leq FFC < 2$
Not fluent, curing	$FFC < 1$

SAMPLE PRODUCT	*DESCRIPTION, GROUP BY GELDART*	*SOLIDS FUNDING PROCESS*
Lime stone, cement, lime, PVC	Easily fluidised, good air holding **Group A:** fine and/or lightweight	Solids Fly Pneu Solids Fluid Pneu Solids Vacu Fill
Sand, bottom ash, granules	Poorly fluidizable, poor air retention **Group B:** granularity middle and/or heavy	Solids Fly Pneu Solids Step Pneu Solids Vacu Dense Solids Truck Discharge
Lime, titanium dioxide, metal oxides, milk powder	Cohesive up to very cohesive, no air retention, rat holes **Group C:** fine and/or heavy	Solids Vibro Puls Pneu Solids Split Pneu Solids Vacu Dense
Sugar, nuts, salt, semolinas, granulates, nuts, almonds, frozen vegetables	Crystalline up to grained, no air retention, not fluidised **Group D:** coarse and/or heavy	Solids Step Pneu Solids Puls Pneu Solids Vacu Dense Solids Truck Discharge
Convenience blends, glass raw, material mixture, dry plaster, with aerosol, batchs, mixtures	Poor air retention, fluidization creates segregation **Group C–D:** fine and/or heavy, coarse and/or heavy	Solids Vibro Puls Pneu Solids Vacu Dense Solids Truck Discharge
Damp sands, mixtures, centrifugal amp solids	Poor air retention, not fluidized, ductile **Analogous group C:** fine up to coarse and damp	Solids Vibro Puls Pneu
Spray granulates, instant products, pills, pastilles, chips, percarbonate, perborate, adipic acid	Sensitive products, agglomerates, poor air retention, not fluidised **Group B + D:** granularity middle up to coarse and/or heavy	Solids Puls Pneu Solids Vacu Dense Solids Truck Discharge
Abrasive products	All products from about hardness 4 on acc. Mohs **Not classified**	Solids Split Pneu Solids Puls Pneu Solids Vacu Dense Solids Truck Discharge
Lumpy recycling-material, shreds	Not fluidised, no air retention **Analogously group B–D**	Solids Fly Pneu Solids Vibro Puls Pneu

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Any questions? Just call – we are happy to help.

LinkedIn YouTube

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