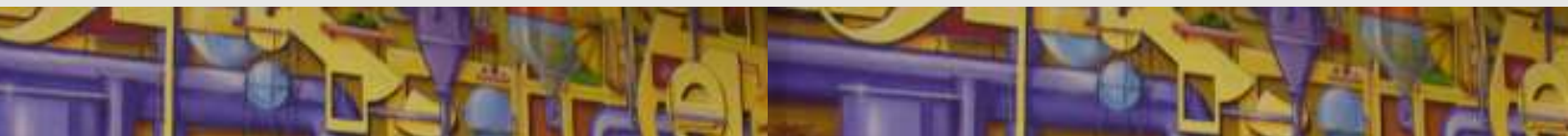


AIR-TEC system

Dense phase pneumatic conveying systems



Satisfying the customer and increase their productivity by developing innovative solutions for the transport of bulk materials using gaseous fluids



Air-Tec system worldwide

Air-Tec system is based in Calderara di Reno, Bologna - Italy.
Over 70% of the manufactured plants is exported all over the world thanks to many distribution agreements with 50 Countries.

Air-Tec system

Air-Tec system® is a leading company in **dense phase pneumatic conveying systems** with gaseous fluids (air or nitrogen).
Founded in 1994, the company has developed a proprietary technology in order to handle and store a wide variety of bulk materials. Air-Tec system patented transporters are developed by highly competent and specialised engineers, and guarantee reliability and safety during the transportation of **foods, as well as of fragile, abrasive, toxic, plastic, and lumpy materials**.

Continuous innovation

Thanks to the continuous investment in research and development, the new solutions offer and guarantee innovation and reliability in several markets; ceramic, foundry, chemical, plastic, milling and feed, food, building, glass, environmental, pharmaceutical, mining.
The continuing technological improvements at Air-Tec system are aimed to *create value for customers* through a wide and flexible range of services to suit customer's individual needs.



A selection of Air-Tec system's customers

Azo - company based in Belgium, specialist at automating raw material handling processes.

NILIT Group (Euronil Thermoplastic Compounds S.p.A.) - producer of thermoplastic compounds; pneumatic transport of fiberglass.

Gruppo Saint Gobain (Verallia) - transport of mixed powders for the French manufacturer of glass packaging.

Ing. E. Mantovani S.p.A. - cement pneumatic conveying for the Mose project, intended to protect the city of Venice, Italy from floods.

San Benedetto S.p.A. - mineral water and soft drinks producer; pneumatic transport of citric acid for iced tea production.

Siemens S.p.A. Water Technologies - transport of dried sludge obtained from the depuration of waste water in Arzignano, Vicenza - Italy.

Villeroy & Boch - three plants for ceramic powder adopted by the ceramics manufacturer of international standing.

Products quality

Air-Tec system has developed three product lines, **Bart**, **Bart-one** and **Tpa**, and a broad range of accessories and components in order to develop customised solutions.

Dense phase pneumatic conveying systems allows transit of lumpy or large materials avoiding segregation of the mixture within the pipes. Clients are able to request technical support to design pipes, assistance and mechanical assembling.

All the Air-Tec system machines are available in carbon steel, AISI304 and AISI 316 (internal finishes for food and pharmaceutical use), for high temperatures (up to 250° C) and for ATEX21 and ATEX22 settings.



Core technology

Air-Tec system's technology allows the movement of powder and granules inside of a pipeline for distances over 500 m and flow rates greater than 100 tons per hour.

The system allows the material to move at low speeds which not only preserves the **quality** and the **integrity of the product** but also the **condition of the pipeline**. It also uses a reduced quantity of air which in turn saves energy.

Low velocity of transport
Completely closed system
with a few moving parts
Simplicity, flexibility and
compactness
High internal cleaning
Reduced maintenance costs



Cutting edge technology at an economic price

Bart and Bart-One lines

Bart is a standard product available in a unique size. Bart-One transporters are suitable for medium length transportation with a capacity up to 20 tons/h depending on the length of the trajectory and the transported material. They have a capacity of 900 litres. For both of the lines there is also a HT version (high temperature) for the transport of material up to 200°, like ashes and slag.

Bart



This is a smaller dimension system which is quiet and suitable for trajectories up to 20 meters (55 feet), with a capacity of 1 ton/h and a pressure capacity up to 2 bar.

Bart is able to transport fragile dust or materials that tend to agglomerate. It is particularly suitable for humid places, and the food, chemical or pharmaceutical industries.

The bart size is one (capacity 24 litres), with a loading mouth 150mm in diameter and an exit tube of 1.5", 2" e 3" diameter.

Bart-One 80



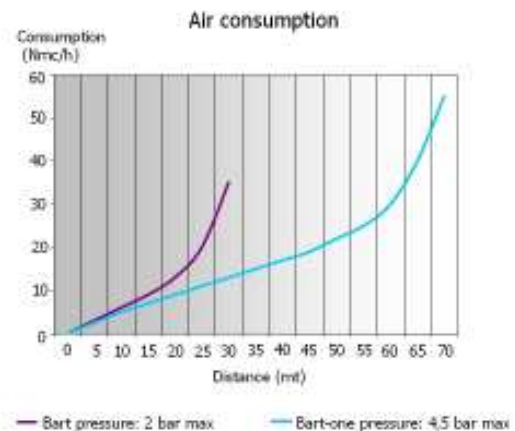
Transporter suitable for transport up to 50 meters (140 feet) with a capacity of 80 litres and a pressure limit up to 4,5 bar (tested till 6 bar according the PED - European Pressure Equipment Directive).

Bart-One has a capacity up to 2 ton/h and a loading mouth of 200mm in diameter and an unloading mouth of 2", 3" e 4".

The Bart-One has been designed for the conventional method of transportation (or hollow tube). It is also suitable for movement with full tube for fragile materials, abrasive and mixtures and for use as a metering system on the scale.

Bart-One 150 - 300 - 600 - 900

The Bart-One transporters are available in four different capacities: 150, 300, 600 and 900 litres. All of them have a capacity from 3 to 20 ton/h and are equipped with an advanced control system of introduced air. They are suitable for transport up to 70 metres (200 feet) and for pressure up to 6 bar and have a loading mouth of 200 and 250mm in diameter.



The reported values are only indicative and they can vary depending on the function of the material and the distance.

Tpa line

The TPA line is suitable for transports with more than 500 meter length or with fragile and difficult products and with a capacity higher than 100 ton/h.

Thanks to the presence of advanced electronic components, the TPA line enables a bigger flexibility of application and a better control of the transport cycle.

It is designed to guarantee the integrity of the granular and powdery materials during transport. It is also designed to ensure a high level of the system's efficiency.

The TPA transporter are available in three types depending on the chosen **system of transport**:

Conventional

The line of transport is emptied after each loading. The TPA conventional transporters are suitable for moving fragile materials.

Full pipeline

The transport happens with a full pipe. This permits air and energy saving compared with the conventional method.

The TPA full pipeline transporters are used to move fragile and abrasive materials.

Full pipeline continuous

The use of two TPA full pipeline transporters connected between them renders possible a constant trajectory of the material inside of the pipe reducing the system's loading time.

On the next page the graphics will show how a typical cycle of transport works. The transport speed is proportional to the length of the route. By contrast, the pressure of transport decreases to zero till the end of the route.

The air intake, through an appropriate booster, ensures the complete control of the material, which is essential in the case of fragile goods.

Advanced solutions for complicated transports



The reported values are only indicative and they can vary depending on the function of the material and the distance.

Phase 1

The vessel is loaded, normally by gravity. When the level sensor indicates that the vessel is full, the loading valves and the vent valves close releasing compressed air or other inert gases.

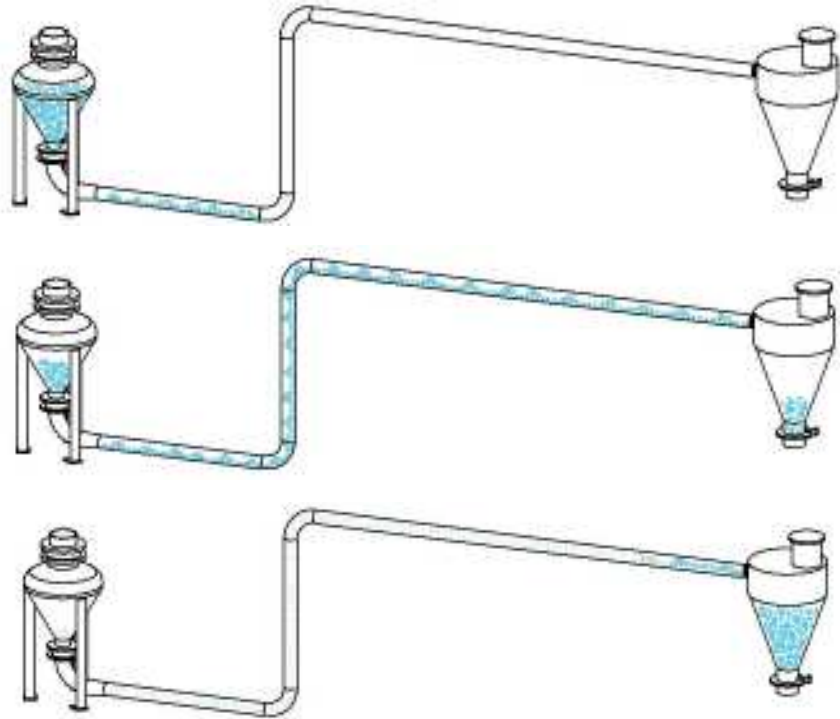
Phase 2

The material is then pushed on to the transport line to the hopper.

Phase 3

When the material is loaded, the pressure switch of the vessel goes to zero. The intake of compressed air stops and the loading valve will open to start a new cycle (phase 1).

Conventional transport cycle or hollow tube



Full pipeline transport cycle or full tube

Phase 1

The vessel is loaded, normally by gravity. When the level sensor indicates that the vessel is full, the loading valves and the vent valves close releasing compressed air or other inert gases.

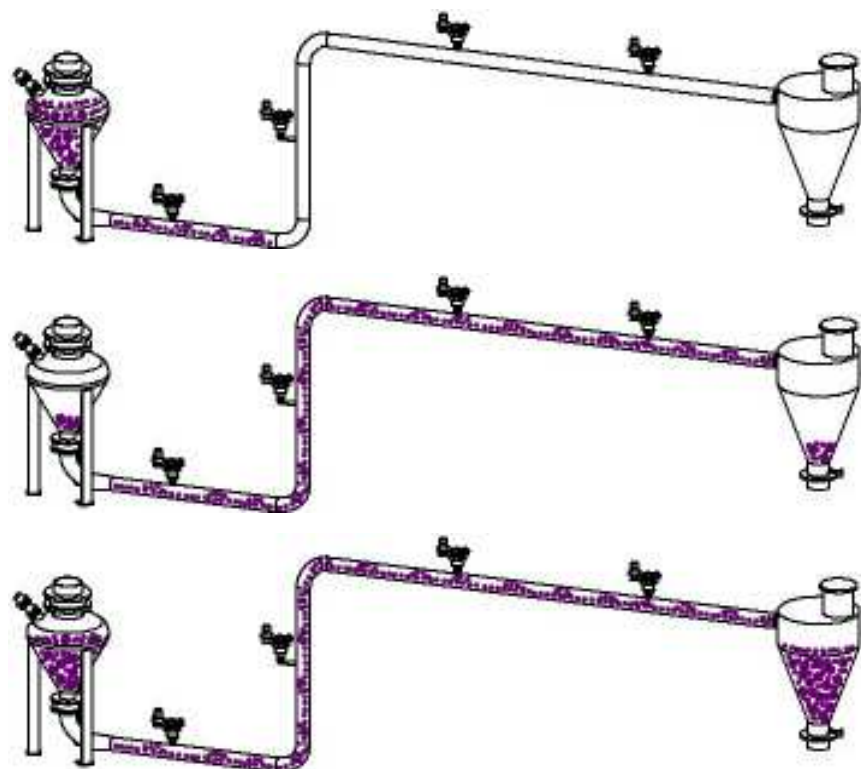
It could also be used a booster to push the material to the transport line to the hopper.

Phase 2

The transport continues until the sensor falls to the minimum level which indicates the vessel is empty. The transport stops and the loading valve opens again.

Phase 3

The transport cycle starts again filling up the vessel. In this way, the line will remain always full.



Components and accessories

Highly sophisticated components and accessories complete the offer of pneumatic conveying systems.

Big bag unloading

Emptying systems for bags of 1000, 1500, 2000 kg containing material hanging on special hooks using a forklift or a hoist. The stations are equipped with pneumatic pistons to break internal lumps. They are complete with unloading hoppers which are dimensioned depending on the installation needs. This is also available with special gloves for toxic products.



Manual bag splitter

The bag splitters' stations allows the manual emptying of bags up to 25 kg containing powdery or granular materials in dust free places avoiding pollution. This is also available with special gloves for toxic materials. These can be connected to transporters and conveying cochlea.



Automatic bag splitter

Stations for emptying bags automatically up to 25kg. The machine is able to separate the material from the sacks and convey it to other machines by a cochlea.

Lump breakers or Clodder

The lump breakers' system allows the breaking up of any lump that could have been formed before the loading process. The presence of a double engine and a space between the blades (2 cm) facilitates effective crushing also for high quantities.



Diverters

They are placed along the pipes trajectory according to the customers needs.

Diverters are intended to direct the flow of material in two or three different directions. They are equipped with an adjustable sleeve. They are certified up to 6 bar pressure and they are available only in sizes from 2" to 6".

A special low cost 2" version diverters application is also available. It has the same characteristics as other diverters.



Anti wear elbows

The anti wear cast iron elbows are used to transport abrasive materials as they are very thick. They are not for straight trajectories. Anti wear elbows are available in sectors of 30°. They are modular by curves up to 90°. Their size can range from 2" to 4" and they are also available in NI Hard type version.

Wide beam elbows

The wide beam elbows are used in non straight trajectories for the transport of non abrasive materials. The size ranges from 2" to 6". They are applicable internally or externally to the silo.

Vibra flow

The vibra flow is used to facilitate the flow of compressed materials from silos or hoppers to the transporter. This can be applied inside or outside the transporter.



Valve receiver

Valve receivers are positioned on the silo. If open the material flows inside of the silo; if closed the material moves towards the next destination.



Spy

The spy is positioned on the pipes to make the material in transit visible.

Coupling systems

They allow for the temporary connection between two ends of pipes.

Air gravity conveyor

The air gravity conveyors connect a silo to a vessel or two silos between them. They allow the exit of the material in a non-vertical straight tract taking advantage of the force of gravity. The angle depends on the type of material.



Booster

The booster allows for the introduction of air into the pipes which are destined to transport material in order to make a homogeneous trajectory. It is possible to regulate the quantity of air into the pipes.

Pipes

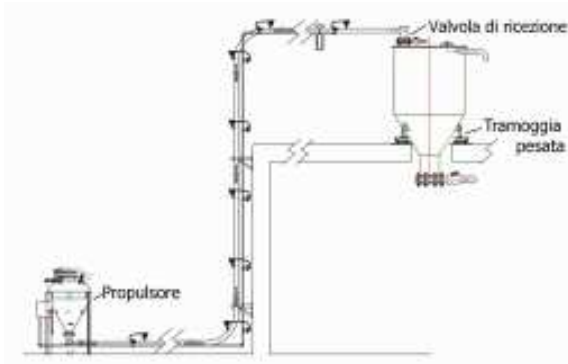
The transport path comprises a line for air and another one for the material. Using special booster air is introduced into the pipes dedicated to the material.

According to clients' needs, plants can be provided with: **guillotine valves, pressure relief valves, butterfly valves, dust collectors, rotating paddle bin level indicators, silencer.**

Solutions for pneumatic conveying

Thanks to a consolidate experience in pneumatic transport, Air-Tec system is able to offer some solutions which could include a **transporter** and **accessories** or a **component**. Qualified professionals can design other solutions depending on the customer's needs.

Innovation in all the industrial application field



Dose-Flow: suitable system for the **dosage of cement and pre-mixed**.

Bart with dust collector: solution for sending up to 30 meters of distance of sucked up dust.



Big bag unloading with Bart



Bag splitter with cochlea or Bart

Tpa with insulated pipes to transport ash



Experience
Efficiency
Research



Service

Air-Tec system provides a pilot plant at its headquarters at Calderara di Reno, Bologna - Italy. Air-Tec system combines this facility with an engineering design service and technical assistance. Solutions are made with sophisticated automation software developed by a dedicated electronic department.

Test laboratory

Air-Tec system's pilot pneumatic plant is able to perform tests on customers' products, whether powdered or granular and verify transport features prior to fabrication. The laboratory has a materials database covering more than 2000 samples with the corresponding characteristics carefully determined: air consumption, pressure, speed and carrying capacity (maximum volume), yield coefficient, fragility of the materials and further information on request. The minimum amount of material needed for each test is 0,5 m³.

Tests enable to:

- Highlight important information for plant design.
- Optimise times and procedures during the machinery's start-up.
- Look at new solutions.
- Show the system's operation during the site visit.



Engineering

After a thorough review of the conditions and space available at an intended site and what system would be most suitable Air-Tec system's professionals support customers, in choosing the type of transport required dependent on the length of the route and the characteristics and quantity of material.

The **study of the plant's layout** includes: logical development, the provision of components and equipment with accessories, the design of the lines to carry material and compressed air, structural calculations, where necessary, and relevant to consumption of air or other gaseous fluid used to transport.

Automation

Air-Tec system solutions provide **advanced automation technology** to manage and control the entire cycle of transport, from the loading of the vessel to the destination chosen by the customer.

The automation software is programmed to perform operations relating to the stages of loading, movement and washing. It is designed according to the customer's needs and on the plant's characteristics and can be adapted to provide solutions to the most complex problems.

The electrical panel consists of a PLC (programmable logic controller) which is able to elaborate signs from sensors and other electronic components to control the entire process of transport.

The main functions of the electrical panel are: The setting of various parameters, such as time and pressure according to different phases; the management of the opening and closing valves; the management of the intake and venting compressed air; the viewing of the work phase of the plant.

The panel offers the possibility to select the most appropriate mode of operation: the manual mode (element by element) manages each use individually and verifies their efficiency; the semi-automatic mode (with periods of work), controls the loading, the transport and the washing; the automatic mode manages the different phases of work automatically based on the received signals.

During the pre-testing procedure, Air-Tec system verifies the panel's electro-mechanical operation and the automation steps.

The system will be tested during the plant's start-up on the customer's site.

Service

Air- Tec system offers a timely and efficient service for the management of the assistance's procedures, updating and revising the pneumatic conveying systems and bulk handling.

Thanks to this dedicated attention to customer service and to the multiyear experience in solving problems as they arise in the plants, Air- Tec system is able to offer:

- Solutions tailored to customer needs.
- Start- up service for new conveying systems.
- Training courses on the operation of Air-Tec system's equipment.
- Setup and calibration services.
- Technical assistance.
- Supply of spare parts.
- Plant maintenance and overhaul.
- Support for the expansion of existing plants.



Materials handled

| | | | |
|------------------------------|------------------------|-------------------------|----------------------------|
| Acrylamide | Clay tile | Magnesium chloride | Refractory batch |
| Acrylic modifier | Coal | Magnesium oxide | Resin |
| Active carbon | Coal dust | Maltodextrin | Resin copolymer |
| Adipic acid | Coal slag | Manganese dioxide | Resin-coated sands |
| Alumina | Cobalt oxide | Marble chips | Rice grains |
| Aluminium fluoride | Cocoa | Medicinal herbs | Rock dust |
| Aluminium nitride | Coffee beans | Melamine powder | Rye flour |
| Aluminium silicate | Coke | Metal powder | Saccharin sodium |
| Ascorbic acid | Copper matte | Mica | Salt crystals |
| Atomized aluminium powder | Copper Powder | Milk powder | Sand |
| Barium and strontium sulfate | Corn | Milled zircon | Scrap glass |
| Barium sulfate | Corn Gluten Meal | Mineral black | Silica |
| Barley malt | Corn Grits | Mixed sand and soda ash | Silica flour |
| Base granules detergent | Couscous | Molybdenum oxide | Silica sand |
| Bed ash | Crispy rice | Monoammonium phosphate | Silicates |
| Bentonite | Crushed rock | Mortar mix | Silicon carbide |
| Bicarbonate | Cryolite dust | Mush | Silicon dioxide |
| Biscuit mix | Desiccated coconut | Nickel carbonate | Silicon powder |
| Black sand | Dextrose | Nickel granules | Soda ash |
| Blended glass batch | Diatomaceous earth | Nickel oxide | Sodium carbonate peroxide |
| Bone meals | Disodium phosphate | Nickel sulfate | Sodium chlorate |
| Borax | Dolomite | Nylon pellets | Sodium citrate |
| Boric acid | Dried Anthracite | Oat flakes | Sodium fluoride |
| Bran flakes | Dried peas | Olivine sand | Sodium nitrate |
| Bread crumbs | Dried sludge | Paper pulp | Sodium perborate |
| Burnt sand | Dry ash | Parmesan cheese | Sodium percarbonate |
| Cake mix | Dry Soap | Peanuts | Sodium polyacrylate |
| Calcium carbonate | Epoxy resin | Perlite | Sodium stearate |
| Calcium fluoride | Ethylene vinyl acetate | Pet food | Sodium sulfate |
| Calcium oxide | Feldspar | Pharmaceutical gelatin | Sodium triphosphate |
| Calcium phosphate | Ferrite | Phenolic resin | Soy protein powder |
| Calcium silicate | Fiberglass | Phosphoric anhydride | Soybean meal |
| Calcium stearate | Fly ash | Pink Beans | Spodumene |
| Calcium sulfate | Foundry dust | Plastic caps | Starch |
| Calium carbide | Freeze dried coffee | Plastic Pellet | Sugar |
| Carbon black | Frit | Plastic resin pellet | Superabsorbent polymer |
| Carbon Mix | Fructose | Polyester | Talc |
| Carnalite | Fumed silica | Polyethylene | Tea |
| Catalyst | Glass batch | Polyethylene glycol | Tile dust |
| Cellite | Glass beads | Polypropylene | Titanium dioxide |
| Cellulose | Granola | Polystyrene | Titanium slag |
| Cement | Graphite | Polyvinyl chloride | Tobacco |
| Cement blend | Green oats | Popcorns | Trisodium phosphate powder |
| Ceramic | Groats | Potash | Urea |
| Ceramic dust | Gypsum | Potassium carbonate | Vermiculite |
| Cereals | Hydrated alumina | Potassium sulfate | Vinyl resin |
| Chamomile | Hydroquinone | Potato flakes | Vinyl tile chips |
| Charred wood | Ilmenite | Potato flour | Wheat flour |
| Chewing gum base | Iron oxide | Prilled ferrous sulfate | Wollastonite |
| Chicken seasoning | Iron powder | Pvc compounds | Zeolite |
| China clay | Lactose | Pvc powder | Zinc oxide |
| Chromic acid | Lignite | Pvc resin | Zinc powder |
| Citric acid | Lime | Pyrite concentrate | Zinc stearate |
| Clay | Limestone | Reclaimed sand | Zirconium |
| Clay calcined | Magnesite | Red lead | Zirconium carbonate |



For Atex

Corporate headquarters

Air-Tec system s.r.l.

Via del Cerchio 3/2

40012 Calderara di Reno, Bologna - Italy

Tel +39 051 725128 Fax +39 051 725146

www.air-tec.it airtec@air-tec.it

P. IVA IT04202180370