ADVANCED SOLUTIONS FOR BLENDING CONTROL AND MANAGEMENT OF EXTRUSION PROCESSES
ADVANCED SOLUTIONS FOR BLENDING, CONTROL AND MANAGEMENT OF EXTRUSION PROCESSES.

Since 1994 Doteco S.p.a has been operating successfully in the plastics processing industry, especially in the extrusion of plastic film, sheets, profiles and synthetic fibres. Through daily contact with our customers and their requirements, we are able to understand and predict the technological evolution of transformation processes and to develop automation solutions that are increasingly in line with market expectations. Doteco has thus earned an avant-garde position in the production of gravimetric blenders, yield control, auto profile control and complete supervisory systems.

Our team offers experience with a combination of flexibility and talent for rapid updating which is fundamental to keeping ahead of the relentless technological evolution in our sector. This is another reason why DOTECO has been chosen as a partner of leading world companies.

Doteco products are delivered to the customer after factory inspection, ready for installation. Each item undergoes careful quality control, starting with rigorous supplier evaluation for component purchase or the construction of parts from drawings. Our main competitive levers are our wide range of products, an excellent quality/price ratio that speeds return on investment and a highly efficient after-sales technical service for customers all over the world.

Our wish to offer original, practical and reliable products at competitive prices has led our efforts towards an ambitious objective: to do our job WITH PASSION in the best possible way.

WEB SITE: WWW.DOTECO.COM
**THE FIGURES**

**ESTABLISHED.** Jan 1994

**SITE AREA.** 5,900 m²

**OFFICE FLOOR AREA.** 800 m²

**FACTORY FLOOR AREA.** 2,200 m²

**STAFF (July 2014).**

56 PEOPLE (AT THE HEADQUARTER)

9 PEOPLE (AT SUBSIDIARIES)

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**THE COMPANY**

Doteco has been operating successfully since 1994, specializing in the processing of plastics, in particular the extrusion of plastic films and synthetic fibres.

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**OUR MISSION**

**PARTNERSHIP WITH LARGE COMPANIES**

Today, DOTECO works in partnership with large companies throughout the world and is at the forefront in manufacturing gravimetric and volumetric blenders, in process control and in factory supervision.

**CONTINUOUS TECHNOLOGICAL RESEARCH**

Continuous technological research has enabled us to understand and predict advances in manufacturing processes and consequently to develop increasingly precise and effective automated procedures.

**THE BEST INVESTMENT**

Our main competitive levers lie in a wide range of products, a great value for money to reduce the investment payback period and a highly efficient after-sales technical service accessible to customers in any part of the world.
THE ADVANTAGES OF GRAVIMETRIC BLENDING

As it is unaffected by bulk density variations in the material to be metered, there is no need for the frequent calibration operations required by volumetric feeders. Guaranteed constant quality and repeatability. Accuracy leading to considerable savings in raw material, the ingredients are metered without waste. Supplies process information for quality assurance.

MAIN FEATURES

Self-supporting structure suitable for pre-storage hopper and/or vacuum loader installation without additional supports. The on-board control box does not require any floor space. All parts that come into contact with the ingredients are made of satin stainless steel, or of food-grade materials or finishes. Flashing alarm signal and diagnostics in plain text. No scheduled maintenance is required. Reduced installation costs. Complete wiring of the dosing unit is carried out by the manufacturer.

GRAVILINE

Integrated gravimetric extrusion control available for EXTRUMATE - GRADO - COMPO - BLEND0

Option suggested for mono extrusion and co-extrusion processes, for blown film, cast film, sheets and for the production of tubes, profiles and cables. The system controls the weight per meter of the end product, reaching and maintaining minimum tolerances. GRAVILINE transforms the extruder into a gravimetric metering device. In fact, the system can measure and control extruder throughput or use the data to control line speed, or alternatively, carry out both functions simultaneously. With multi-layer lines the throughput of each extruder is measured and controlled to maintain a constant layer-to-layer percentage ratio in the end product.

SMARTCONVEY

Integrated central vacuum conveying system

Available for use with all gravimetric systems as an alternative to single hopper loaders. SmartConvey is a fully automated loading system, operated by the interface used for gravimetric blending. It efficiently and practically solves all the problems involved in raw material loading.

GAS TIGHT FEATURES

Only available for Blendo and Compo units.

ACCESSORIES

Custom made throat adapter neck, with drain spout and manual slide gate.
Custom made throat adapter neck with magnet drawer.
Low-level sensors for pre-storage hoppers.
Encoder kit for line speed measurement.
Continuous gravimetric blender, designed to blend pellets in extrusion processes where dosing accuracy and a homogeneous dispersion of additives are strictly required. Unaffected by vibrations, BLENDÒ has been designed to be easily mounted directly on the extruder throat to replace the conventional feed hopper, or for mezzanine mounting.

**CONTINUOUS BLENDER OPERATION**

Precise continuous loss in weight control.
- Weight loss of each ingredient is measured.
- All ingredients are simultaneously metered through the auger directly into the integral weigh downcomer hopper, through the cascade mixer.
- The weight of blended material in the downcomer hopper is continuously monitored to sense level variations caused by changes in extruder throughput or non-alignment between the feeders and extruder throughputs.
- The feeders are individually controlled to achieve and maintain the preset blend ratios and to keep at the preset value the downcomer hopper level. This means that the blending throughput is always aligned with that of the processing machine.

**CASCADE MIXER ACTION**

The ingredients are simultaneously metered in the right proportion directly into the cascade mixer where the different streams are mixed to form a homogenous blend with a perfect dispersion of additives.

**INTEGRAL WEIGH DOWNCOMER HOPPER**

This hopper collects the blend from the cascade mixer to feed the extruder ensuring an adequate head of blended material on the plasticizing screw. The cylindrical shape and the reduced material resident time prevent the formation of preferential flows and the ingredients from de-mixing.

**MAIN FEATURES**

- **BLENDÒ** is available in 16 models:
  - 2, 3, 4, 6 or 8 ingredients, with throughputs of 150, 300, 600, 1000 up to 2000 kg/h.
- Standard supplied integrated refill valves, slide gate type.
- Inclined screw feeders to improve metering accuracy and to prevent undesired dribble. They are driven, with a wide range of speeds, by DC motors with long-life brushes and closed-loop speed regulation.
- Auger screws suitable for granules or free-flowing powders.
- A cascade mixer provides excellent additive dispersion, including ingredients with different bulk densities or granule size.
- Integral weigh downcomer hopper for extruder demand or gravimetric throughput control. Load cell to sense variations in weight (no ultrasonic or capacitive sensor).
- Easy to use, simply set the dosing percentage.

**FAST INGREDIENT CHANGE, QUICK AND THOROUGH CLEANING**

- Practical and easy access to all components.
- Feed hoppers with sight glass for visual level control and quick-release ring clamp for easy cover removal.
- Manual slide gate for auger screw inspection without hopper emptying.
- Drain spout for easy and quick hopper emptying.
- Easily accessible auger screws for quick and thorough cleaning, no tools required.
Continuous gravimetric multi-ingredient feeder, designed to blend pellets in extrusion processes which require precise and consistent blending. Unaffected by vibrations, COMPO has been designed to be easily mounted directly onto the extruder throat to replace the conventional feed hopper.

**MAIN FEATURES**
- COMPO is available in 12 models: 2, 3, 4 or 6 ingredients, with throughputs of 150, 300, 600, 1000 up to 2000 kg/h.
- Standard supplied integrated refill valve, slide gate type.
- Inclined screw feeders to improve metering accuracy and to prevent undesired dribble. They are driven, with a wide range of speeds, by DC motors with long-life brushes and closed-loop speed regulation.
- Auger screws suitable for pellets or free-flowing powders.
- A static mixer to blend ingredients, including ingredients with different bulk densities or granule size.
- The main ingredient feed hopper ensures adequate head of material on the plasticizing screw.
- Easy to use, simply set the dosing percentage.

**CONTINUOUS GRAVIMETRIC FEEDER OPERATION**
- Continuous loss in weight control:
  - Weight loss of main ingredient is sensed.
  - Weight loss of side ingredients is sensed.
  - The side ingredients are simultaneously metered in the static mixer where they are mixed with the main ingredient flowing down, by gravity, from its feed hopper.
  - The feeders of the side ingredients are individually controlled to achieve and maintain the preset blend ratios with the main ingredient. This means that the blending throughput is always aligned with that of the processing machine.

**STATIC MIXER**
- The side ingredients are simultaneously metered by auger screw feeders in the right proportion and are thoroughly spread out into the stream of the main ingredient flowing down from its feed hopper.

**FAST INGREDIENT CHANGE, QUICK AND THOROUGH CLEANING**
- Practical and easy access to all components.
- Feed hoppers with sight glass for visual level control and quick-release ring clamp for easy cover removal.
- Manual slide gate for auger screw inspection without hopper emptying.
- Drain spout for easy and quick hopper emptying.
- Easily accessible auger screws for quick and thorough cleaning, no tools required.

**GRAVIFEED AND SPECIAL COMPO FOR STARVE FEEDING**
GRAVIFEED
Continuous gravimetric blender, designed to blend pellets, regrind and flakes in extrusion processes where key-factors are the dosing accuracy and the capability to follow and compensate the variations of unstable processes.

**MAIN FEATURES**
- Quick and easy access to all parts.
- Drain spout for quick and complete feed hopper emptying.
- Clean out doors for fast removal of dust or ingredient residues and for visual inspection.
- Self-supporting structure prearranged for vacuum receiver installation without additional supports.
- The on-board control box does not require any floor space.
- PLC based control, CPU x86 100 MHz Intel compatible (or superior).
- Standard type load cells, high resolution weighing system (16 bit A/D converter) to maximize analog accuracy.
- Flashing alarm signal and diagnostics in plain text.
- No scheduled maintenance is required.
- Reduced installation costs. Complete wiring of the dosing unit is factory made.

**VIBRATORY TRAY FEEDERS**
- Each ingredient (main and additives) is continuously metered by individual vibratory tray feeders.
- Therefore the system is suitable to feed pellets and also regrind and flakes, with a wide variety of bulk densities and flowability.

**FREE FLOWING PELLETS AND GRANULES**
- Flakes
- Regrind

**WIDE RANGE OF NETWORKING OPTIONS FOR REMOTE CONTROL AND DATA ACQUISITION**
- OPC via Ethernet (one entry-point)
- OPC via CanBus (one entry-point or multi entry-point)
- ModBus TCP/IP (one entry-point)
- RS485/422 ModBus (one entry-point or multi entry-point)
- Profibus (one entry-point or multi entry-point)
- Canbus (one entry-point or multi entry-point)

**FULL GRAVIMETRIC CONTINUOUS LOSS-IN-WEIGHT BLENDING**
- Our latest state-of-the-art control software coupled with the most performing PLC’s and load cells.
- Highest level of accuracy and precision.
- An advanced weighing system, immune to background ‘noises’, for the highest degree of accuracy during the dynamic control stages.

**MODELS AND THROUGHPUTS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Min Kg/h</th>
<th>Max Kg/h</th>
<th>Ref. PSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>5 Kg/h</td>
<td>200 Kg/h</td>
<td>0.57</td>
</tr>
<tr>
<td>Medium</td>
<td>40 Kg/h</td>
<td>750 Kg/h</td>
<td>0.35</td>
</tr>
<tr>
<td>Large</td>
<td>80 Kg/h</td>
<td>1500 Kg/h</td>
<td>0.35</td>
</tr>
<tr>
<td>Extra large</td>
<td>150 Kg/h</td>
<td>2500 Kg/h</td>
<td>0.35</td>
</tr>
</tbody>
</table>

- Efficiency of the measurement and control systems results in the highest degree of precision during the dynamic phases of the process, in which the system can accurately follow any change in the throughput inputs in real time and, consequently, offset melt pressure variations instantaneously.

- Each ingredient (main and additives) is continuously metered by individual vibratory tray feeders.
- Therefore the system is suitable to feed pellets and also regrind and flakes, with a wide variety of bulk densities and flowability.

- Free flowing pellets and granules
- Flakes
- Regrind

- Each ingredient (main and additives) is continuously metered by individual vibratory tray feeders.
- Therefore the system is suitable to feed pellets and also regrind and flakes, with a wide variety of bulk densities and flowability.

- Free flowing pellets and granules
- Flakes
- Regrind
Gravimetric batch blender, designed to blend free flowing pellets in processes which require accurate dosing and repeatability with efficient mixing. Unaffected by vibrations, GRADO has been designed to be easily mounted directly onto the throat of the processing machine, to be installed either on a mezzanine, or on a vacuum take-off stand to feed one or more machines.

**MAIN FEATURES**
- **GRADO** is available in 14 models: 2, 4 or 6 ingredients, with throughputs up to 150, 300, 600 and 1000 kg/h.
- Partitioned hopper complete with cover prearranged for vacuum loader installation.
- Patented dispense valve, slide gate type.
- Drain spout for easy and quick complete partitioned hopper emptying.
- Mixer driven by AC motor, continuous or timed operation.
- Easy to use, simply set the dosing percentage.
- Material flow control valve, supplied when the batch blender is mounted on a mezzanine or a vacuum take-off stand.

**INTEGRATED GRAVIMETRIC EXTRUSION CONTROL**
GRADO uses an internal LOSS-IN-WEIGHT mixing chamber with a hemispheric button installed on a load cell which continuously weighs the materials used; the extruder becomes a gravimetric metering device. The system can measure and control the extrusion throughput or use this value to control line speed, or alternatively, perform both functions simultaneously. With multi-layer lines, each individual extruder throughput is measured and controlled to maintain a constant layer-to-layer percentage ratio in the end product.

**GRAVIMETRIC BATCH BLENDER OPERATION**
Batch gain-in-weight control.
- Each ingredient is fed, in sequence, into the weigh bin through slide gate valves.
- On reaching the preset batch weight, a special sensor signal causes the batch to be discharged into the mixing chamber.

**MIXER WITH SEMI-SPHERICAL BOTTOM**
As the mixer bottom is semi-spherical, there are no stagnation areas. The mixing paddle moves the entire mass of material resulting in a homogeneous blend and preventing the formation of preferential flows that would favor the separation of the ingredients into finer, heavier or more flowing granule sizes.

- Practical and easy access to all components with no need to stop or “dismantle” the machine.
- The feed hopper is completely emptied through a special drain spout built, under patent, in the dosing slide gate.
- Sight glass clean out ports for each compartment, for fast and easy removal of dust or ingredient residues and for visual inspection.
- Bridge breaker for non free-flowing materials.
With the ADROIT version, we gave GRADO some further characteristics which make it even more unique:

- innovative industrial design
- D.I.Y. modularity to add more ingredients
- improved reliability
- reduced maintenance
- higher & constant throughputs
- improved gravimetric efficiency
- easier cleaning and maintenance

Suitable to be installed in-line, directly on the extruder throat or either on a mezzanine, and also off-line, on a take-off stand to feed one or more extruders.

Available in 6 different sizes:
- 200, 400, 800 and 1,300 kg/h
Each size is available in 5 models:
- from 2 ingredients up to 6 ingredients.

GRADO ADROIT is the third generation of GRADO, the batch blender which became a best seller and a master-piece for the plastic extrusion industry.

**ULTIMATE DESIGN & TECHNOLOGY**

**INGREDIENT CHANGEOVER AND CLEANING HAS NEVER BEEN SO EASY AND QUICK**

- spherical mixing chamber with conical bottom part, to guarantee the most efficient mixing action and no residuals to stuck into
- discharge spouts with slide gates
- inclined slide-gate, linked to the drain spout, to guarantee a complete draining of the ingredient, with no residuals to stuck into
- quickly removable slide-gate block for deep cleaning

**MODULARITY**

**IT’S A FULL MODULAR BLENDER**

The “basic machine” [for 2 ingredients] comes already provided with wiring terminals and control box prearranged for upgrading up to 6 ingredients.

Upgrading kits include all parts, wires and fittings needed and easy-to-follow instructions.

Add more ingredients is a D.I.Y. operation, very easy and quick, with no technical commissioning needed.

**INCOMPARABLE ACCURACY AND PRECISION HIGHEST THROUGHPUT IN A SMALL SIZE**

- radically improved kinetic of the slide-gate
- innovative techno-polymer flaps
- double lip polymer seals
- vibration dumpers on the weight bin
- last generation electronic B&R-X20

give GRADO ADROIT

- the most precise and accurate dosing performances
- the highest gravimetric efficiency
- an incomparable performance of blending accuracy and precision, most probably the best ever seen in a batch blender
- the highest throughput related to the machine size
- higher reliability, i.e. less maintenance and longer life time
• Gravimetric gain-in-weight blending
• Gravimetric loss-in-weight extrusion control (extruders control and take-off control)

Batch gain-in-weight blending: ingredients are dosed, in sequence, by a slide-gate valve, and then fed into a gravimetric bin, mounted on load-cells.

DOUBLE ACTION BLENDER

GRADO ADROIT has an internal loss-in-weight mixing chamber, with an hemispheric bottom, installed on load-cells, which continuously weighs the material flow into the extruder. The system can measure and control the extrusion throughput or use this value to control the line speed or, as an alternative, perform both functions simultaneously. With multi-layer lines, each extruder throughput is measured and controlled to maintain a constant layer-to-layer ratio.

INTEGRATED VACUUM LOADING SYSTEM SMARTCONVEY

Fully automatic vacuum loading system, controlled by the same PLC which controls the blending system and operated by the same HMI. One or more vacuum pumps to serve one or more receivers, whose association can be set through personalized configuration.

All receivers linked to one pump are served in turn, according to a priority sequence which is automatically assigned by the control PLC. Changeover Active Control software available, to minimize the ingredients residual quantity at the end of any job order.
Suitable for mono and multi-layer extrusion lines, for blown film, cast film, sheets, and for the production of tubes, profiles and cables. Controls the weight per meter of end product reaching and maintaining tighter tolerances, regardless of changes in extruder throughput commonly caused by:

- progressive clogging of the filter
- variations in melt temperature
- variations in polymer viscosity or bulk density
- plasticizing screw wear.

Reduces start-up and production change.

Optimizes consumption of raw materials and cuts down on waste.

Ensures constant quality and repeatability.

**MAIN FEATURES**

- **EXTRUMATE** is available in various models to meet mono and co-extrusion process requirements.
- Throughputs of 150, 300, 600, 1000 up to 2000 kg/h.
- Easy installation of the weigh hopper directly on the extruder throat replacing the conventional feed hopper.
- Weigh hopper assembly prearranged for pre-storage hopper and/or vacuum loader installation without additional supports.
- Setpoint entry for single layer extrusion line.
  - Extruder rate by weight or
  - Weight of product per running length or
  - Average thickness (film width and polymer density input required)
- Setpoint entry for single layer extrusion line.
  - Total extrusion throughput rate by weight and percentage layer ratio or
  - Weight of product per running length and percentage layer ratio or
  - Average total thickness and percentage layer ratio (film width and polymer density input required)

**FAST INGREDIENT CHANGE, QUICK AND THOROUGH CLEANING**

- Quick and easy access to all components.
- Feed hoppers with sight glass for visual level control and quick-release ring clamp for easy cover removal.
- Drain spout for easy and quick hopper emptying.

**SYSTEM OPERATION**

Thanks to the weigh hopper, which continuously weighs the materials used, the extruder becomes a gravimetric metering device. The system can measure and control extrusion throughput or use this value to control line speed, or alternatively, perform both functions simultaneously. With multi-layer lines, each individual extruder throughput is measured and controlled to maintain a constant layer-to-layer percentage ratio in the end product.
Volumetric feeder for additives designed to be mounted on a neck riser, between the processing machine feed hopper and the extruder throat. Used to adjust the blender speed to that of the extruder. Utilizes an input signal proportional to the extruder screw speed.

Adaptive Control (Optional)
Used to adjust the blender speed to that of the extruder. Utilizes an input signal proportional to the extruder screw speed.

Standard Features
- All parts that come into contact with the ingredients are made of satin stainless steel.
- Easy access to all components for quick and thorough cleaning.
- No scheduled maintenance is required.

Options and Accessories
- Suction nozzle.
- Flexible anti-static PUP hose.
- Standard brackets.

Heavy Duty Vacuum Receiver
Different capacities available. The receivers may be used alone, with vacuum supplied by a special vacuum unit, or they can be used in centralized vacuum conveying systems.
- Lid and discharge cone made in aluminum casting, tank in satin stainless steel.
- Modular components are assembled with ring clamps. This allows the separate rotation of the material inlet and vacuum line port, so as to have different orientations.
- Hinged lid for filter inspection or cleaning, no tools required.
- Stainless steel screen filter. No need for periodic replacement.
- Automatic filter cleaning for each loading sequence, with blast of compressed air from the mains, accumulated in the lid built-in tank.
- Volume-fill sensor eliminates the need for setting fill times. The receiver fills until the specified volume is reached, maximizing filling and conveying efficiency.
- Wide discharge outlet for rapid material evacuation without bridging. Rubber gaskets ensure perfect seal of the flapper valve during the suction phase, also in the presence of residual material.
- Hinged flapper valve with integral limit switch, insensitive to dust.
- Multi-purpose mounting brackets as standard.
- Integrated sequencing valve in the lid of the vacuum receiver. Only for centralized systems to direct the vacuum to the right receiver.

Standard Features Heavy Duty Vacuum Receiver
- Lid and discharge cone made in aluminum casting, tank in satin stainless steel.
- Modular components are assembled with ring clamps. This allows the separate rotation of the material inlet and vacuum line port, so as to have different orientations.
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- Hinged flapper valve with integral limit switch, insensitive to dust.
- Multi-purpose mounting brackets as standard.
- Integrated sequencing valve in the lid of the vacuum receiver. Only for centralized systems to direct the vacuum to the right receiver.
SUKO-T
SMARTCONVEY
& CONVYMATE
SUKO-T SMARTCONVEY & CONVYMATE

VACUUM UNIT FOR CENTRALIZED SYSTEMS

VACUUM UNIT FOR CENTRALIZED SYSTEMS

Available in different filter area sizes.
- Protects the pump from damage caused by the intake of fine particles or dust.
- Anti-static polyester cartridge filter.
- Timed compressed air pulses shake the filter to prevent dust build-up.
- Easy accessible dust collection chamber for inspection and emptying.

SUKO-T

Single vacuum hopper loaders “SUKO-T” are suitable for medium rate pneumatic conveying of low-dust pellets.

MAIN FEATURES

- Easy to use, no adjustment is required.
- Compact even under high conveying capacity.
- Flashing alarm lamp.
- Microprocessor based control.

OPERATING PRINCIPLE

- When the vacuum receiver is empty, the discharge flapper valve closes and establishes electrical contact which, in turn, starts-up automatic filter cleaning and the vacuum motor.
- The vacuum in the receiver brings the discharge flapper valve back to a fully closed position and causes the suction of material into the receiver where it settles on the bottom.
- The exhaust air passes through the filter, which retains dust and fine particles, and proceeds towards the pump to be discharged into the environment.
- When the material reaches the volume-fill sensor, the system switches off the vacuum pump.
- The weight of material in the receiver causes the discharge flapper valve to open and the material drops into the machine hopper.
- If the receiver is not completely emptied, the material prevents the flapper valve from closing and the system goes into standby. A new cycle cannot be started-up until it is completely empty.

SAFETY FILTER AND MANUAL CLEANING

- Available in different filter area sizes.
- Protects the pump from damage caused by the intake of fine particles or dust.
- Cartridge filter.
- Easy access for cartridge cleaning and for removing fine particles or dust from the collection chamber.

SELF-CLEANING SAFETY FILTER

- Various capacities available with:
  - 3-phase side-channel vacuum pump.
  - Root blower.
  - Vacuum gauge.
  - High vacuum relief valve.
  - Electrical box with motor thermal cut-out protection.
  - Atmospheric relief valve.
  - Safety filter, cartridge type, manual cleaning.

VACUUM UNIT FOR CENTRALIZED SYSTEMS

- 4 Anti-static polyester cartridge filter.
- Timed compressed air pulses shake the filter to prevent dust build-up.
- Easy accessible dust collection chamber for inspection and emptying.

SUKO-T COMPONENTS

- Receiver.
- Vacuum unit.
- Piping.
- Suction nozzle.

MOUNTING CONFIGURATION

- Vacuum receiver installed directly onto the hopper to be fed.
- Floor vacuum unit.
**SUO-T SMARTCONVEY & CONVYMATE**

**PNEUMATIC CONVEYING SYSTEMS**

**SMARTCONVEY**
Integrated vacuum loading system, with centralized vacuum source, for all types of blenders and gravimetric systems. A fully automated solution which can be used as an alternative to single vacuum loaders, to efficiently and practically solve all the problems involved in the loading of raw materials.

**SMARTCONVEY COMPONENTS**
- Vacuum receivers.
- Remote vacuum unit.
- Piping.
- Suction nozzle.

**SMARTCONVEY FUNCTIONS**
- Run/Stop status.
- Conveying time out/Conveying time (for loaders without volume-fill sensor).
- Pipe purge time.
- Pump switch-off time.
- Alarms:
  - Pump thermal cut-out.
  - Conveying time-out.
  - No convey.

**CONVYMATE**
A stand-alone vacuum conveying system with centralized vacuum source, as an alternative to single loaders, automatically feeds more than one process machine, thus solving the problems involved in distribution of raw materials, efficiently and practically.

**CONVYMATE COMPONENTS**
- Vacuum receivers.
- Vacuum unit.
- Piping.
- Suction nozzle.
- Pipe purge valves.
- Convymate control.

**CONVYMATE FUNCTIONS**
- Run/Stop status.
- Conveying time out/Conveying time (for loaders without volume-fill sensor).
- Station priority level.
- Purge time.
- Receiver selection.
- Pump switch-off time.
- Alarms:
  - Pump thermal cut-out.
  - Conveying time-out.
  - No convey.
  - Communication error.

**MAIN FEATURES**
- Manages up to 8 vacuum pumps and 64 receivers contemporaneously.
- Association between the receivers and the pumps can be freely set through configuration.
- All receivers connected to the same pump are served in turn, according to an automatically assigned priority sequence.
- Each receiver has a microprocessor in serial communication with the others and with the master controller.
- The loading cycle can be managed both by time or volume (level sensor).
- The touch screen provides an intuitive user interface for easy system management.
- Flashing alarm lamp.
- Alarm messages and diagnostics in plain text.
- Reduced installation costs.
- For future expansion, further receivers can be simply connected to the existing network system.
- Wiring with power and serial communication cables for serial connection of receivers and master controller.

**INTELLIGENT CONVEYING SYSTEM**
The blender detects consumption of materials, since it weighs each individual component, also detecting the capacity of pre-storage hoppers and receivers. So, by simply setting the quantity of the order, on completion of production the system is emptied and ready for a new order with no waste of time or raw materials.
Suitable for blown film lines:
- already provided with IBC;
- with stationary or rotating die;
- also for gusseted film.

**MEASURING SYSTEM AND ACCURACY**
- Ultrasonic sensors for stable and repeatable measurement
- Measurement resolution 0.1 mm
- Display resolution 1 mm
- Control accuracy +/-2 mm (for lay-flat up to 1800 mm).

**ADVANTAGES**
- Ideal in case of:
  - frequent lay-flat size changes (on-the-fly);
  - low line speed;
  - personnel with limited experience.
- Simple to use: just set the lay-flat set point and tolerance targets.
- Save time and reduce waste during start-up and size changes.
- Lower tolerances and much better control than with manual adjustments.
- Constant lay-flat stability, all through the production process.
- Supplies process information needed to validate the production lot as required by quality assurance.

**SYSTEM OPERATING MODE AND FUNCTIONS**
- Measurement and control, by ultrasonic sensors:
  - of the bubble diameter;
  - of the distance between the bubble and the cage (gap);
  - of the calibration cage height;
  - of the cage opening.
- Just setting a new lay-flat, the system performs automatically the width size change:
  - adjusting the cage height to suit the BUR value;
  - adjusting the cage opening to suit the width set-point;
  - opening the IBC valve to inflate or deflate the bubble up to the right size;
  - the bubble diameter, hence also the lay-flat width, are kept stable by constantly controlling the gap and the IBC valve opening.
- Continuous display of the lay-flat measurement.
- Reaches and maintains the lay-flat set value.
- Prevents lay-flat variations due to changes of the environment temperature (day/night).
- Manual and automatic operating mode.

**MAIN FEATURES**
- High speed iris valve for controlling the cooling air flow.
- Control panel with operator HMI (touch screen 5.7”)
- Process alarms and diagnostics in plain text.
- Statistical reporting for product quality assurance.

**COMMUNICATION INTERFACES FOR REMOTE CONTROL AND DATA ACQUISITION**
- OPC via Ethernet (one entry-point)
- OPC via CanBus (one entry-point or multi entry-point)
- ModBus TCP/IP (one entry-point)
- RS485/422 ModBus (one entry-point or multi entry-point)
- Profinbus (one entry-point or multi entry-point)
- CanBus (one entry-point or multi entry-point)
PROTUNE
GAUGE CONTROL SYSTEM

HIGHLIGHTS
- Retrofittable.
- Outstanding gauge uniformity and cooling efficiency.
- Design maximize the cooling rate and utilize maximum blower efficiency with proven gauge deviation reduction.
- The operating principles assure a quick response time to any input for thickness correction.
- Superb gauge uniformity while maintaining excellent output.
- Designed to match the exact characteristics of any polymer and provide excellent bubble control and gauge uniformity.
- Suitable for running low melt-strength materials at higher blow-up ratios.
- Repeatable settings of total airflow adjustments by a variable speed AC control for the blower motor.
- Do not require an additional blower or use compressed air.

BREEZE
AUTOMATIC AIR RING
- High performance dual-lip automatic air ring.
- Last state-of-the-art design to start from best performance when automation is off, with highest cooling efficiency of the film with the best stability of the bubble.
- Automatic gauge control made with cartridge heaters, hence:
  - no maintenance required
  - no alteration of the air flow around the bubble
  - very easy to set-up

Model sizes control zones air inlets
<table>
<thead>
<tr>
<th>Model</th>
<th>die ø (mm)</th>
<th>zones</th>
<th>inlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>BREEZE 300</td>
<td>50 ÷ 150</td>
<td>54</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>150 ÷ 300</td>
<td>54</td>
<td>6</td>
</tr>
<tr>
<td>BREEZE 400</td>
<td>300 ÷ 400</td>
<td>66</td>
<td>6</td>
</tr>
<tr>
<td>BREEZE 550</td>
<td>400 ÷ 500</td>
<td>78</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>550</td>
<td>78</td>
<td>8</td>
</tr>
<tr>
<td>BREEZE 800</td>
<td>600</td>
<td>99</td>
<td>8</td>
</tr>
</tbody>
</table>

OPERATING MODE AND FUNCTIONS
- Dual lip air ring BREEZE, fully powered by Doteco.
- Pct-Based Operator Interface with 15” touch-screen colour screen, to display:
  - previous and actual profile comparison (cartesian plot)
  - actual profile (polar)
  - profile trend diagram
  - Control cabinet with automatic gauge control software.
  - Online film thickness sensor Kündig K-300 Rotomat.

ONLINE THICKNESS SENSOR KÜNDIG K-300 ROTOMAT
- The capacitive sensor, on slewing ring, goes around the bubble and measures the film thickness along the circumference, over the frost line.
- The system calculates the thickness average value and the thickness actual values on each radial position (corresponding to the control zones of the automatic air rings).
- Rotates continuously in one direction at a minimum rotation time of 26 seconds.
- Different sizes of slewing rings available for lay-flats from 255 mm up to 3900 mm.
- Sensors with different coatings available: CRS (chrome coated sensor for standard films, excellent durability with abrasive films), PVD-2 (plasma coated sensor for slightly sticky films, good durability with light abrasive films), PTFE (coated sensor for sticky films, short lifetime with abrasive films).
- On demand, the PROTUNE can be interfaced with any other sensor available in the market.
HARDWARE & CONTROL SOFTWARE
HARDWARE & CONTROL SOFTWARE

FEATURES
- High quality tested hardware produced by market leaders.
- Standard type load cells.
- High resolution weighing system (16 bit A/D converter). Amplifier mounted close to the load cell to maximize analog accuracy and minimize noise.
- Doteco own developed software.

REMOTE CONTROL
Optional feature for all gravimetric systems to control the unit and/or for data acquisition via a serial port. Modbus or Profibus protocols available.

OPERATOR INTERFACES
Portable or front panel mounted models available. Connected to the on-board control box by insulated CAN port. The touch screen provides an intuitive user interface for easy management of the gravimetric system.

DTC SERVER
An advanced hardware and software tool developed to be fully compatible with most supervisory, data control and acquisition (SCADA) packages.

It consists of:
- Hardware interface: 1 CAN port and 2 232/422/485 ports, all electrically insulated.
- OPC server: based on interfaces, properties and methods commonly used by SCADA, compatible with OPC (OLE for Process Control) technology, for accessing data from the network of Doteco units.
- Web server: to manage and/or display the process variables through HTML pages accessible via Intranet or remote modem connection via a standard browser (e.g. Internet Explorer, Netscape).
- Machine tuner: menu driven, for running parameter configuration, load cell calibration, diagnostic and modem connection for remote assistance.

DATEXA VIEWER
REMOTE MONITORING SYSTEM

A software package developed in MS Windows environment to supply useful factory process monitoring and data management functions. DATEXA VIEWER provides a complete overview of gravimetric blender data.

DATA CONTROL AND MANAGEMENT
- Management of databases for process parameter storage.
- Recipe storing, upgrade and on-the-fly download.
- Raw material manager: stored with numerical code and description.
- Blending recipes manager: to create or modify and store blending recipes with numerical code and description.
- Extrusion recipe manager: to create or modify and store extrusion recipes with numerical code and description.
- Product manager: to create or modify coded end products. Each product code is assigned to a blending, extrusion and melting temperature recipe.
- Order manager: to create or modify a list of job orders containing useful data for identifying and tracking each order. Each order is assigned a product code.
- Recording of raw material quantity used in the process. Totaling by ingredient.
- Recording of alarm events.
- Statistical process analysis (SPC) for blending and extrusion data.
- Data export for further analysis (Lotus, Excel).

REPORTING
- Inventory report viewing and printing: sorting by product code, job order, recipe and date.
- Quality report viewing and printing: sorting by job order.

SNAP Terminal
Touch screen B/W 5.7” LC display.

SLY Terminal
Touch screen 10.4” color TFT display.

WIT Terminal
Touch screen 15” color TFT display.

Modern assistance
Global modem supplied as standard with all Doteco machines.
DOTEXA MANAGER
EXTRUSION LINE INTEGRATED MANAGEMENT SYSTEM

SIMPLE AND EASY MANAGEMENT OF THE EXTRUSION LINE
- Manage system operation from a single station.
- Easily and quickly set the operating parameters with precision.
- Recall previously stored settings, ensuring fast line start-up and changeover.
- Print production and consumption reports (optional).
- Monitor the process in real time, with immediate and detailed warning of any faults or malfunction.
- Supply process information needed to validate the manufacturing process as required by quality assurance.
- Network connection to factory supervisor.

COMPLETE CONTROL OF PROCESS FUNCTIONS
- An advanced system designed for maximum operator convenience in managing extrusion process, thanks to the touch screen, DOTEXA supplies an intuitive user interface and makes operating an extrusion line easier than ever.
- Provides complete monitoring and control of the extrusion process and functions: resin loading, materials blending, gravimetric feeding, extrusion pressure and temperature, cooling and calibration, thickness profiling, extruder, takeoff and auxiliary equipment speed (on request).

HARDWARE
- Main control cabinet with:
  - Industrial PC 19” SXGA color TFT display with touch screen (resistive).
  - CPU Board Intel Core2 Duo L7400 1.5 GHz, 667 MHz FSB, 4 MB L2 cache.
  - Heavy duty 40 GB hard disk.
  - Master I/O module, CPU x86 100 MHz Intel compatible (supplied if manual line management is required).
  - Operator console for manual line control (supplied if manual line management is required).
- Remote I/O modules from market leader producers, supplied according to system configuration.

SOFTWARE MODULES AVAILABLE
- Manual line management (remote I/O modules required).
- Resin loading: monitoring and setting. Available loading active control as an option.
- Gravimetric blending: data viewing, data setting, recipe storage.
- Extrusion: data viewing, data setting, recipe storage.
- Resin melting monitoring: setting and monitoring at digital temperature controller (not supplied, serial port required).
- Resin melting control: setting, monitoring and control (PID control algorithms) of all heating and cooling zones (remote I/O modules required).
- Lay flat width interfacing: setting and monitoring through W-SCAN system.
- Internal Bubble Cooling interfacing: setting and monitoring through IBC Control System.
- Cage control system interfacing: setting and monitoring through KALIBRO System.
- Thickness profiling interfacing: polar and Cartesian plots.
- Auto profile: polar and Cartesian plots.
- Alarm and event warning.
- Short term alarm display.
- Modern assistance.
- Customer auxiliary equipment interfacing: monitoring.

MANAGEMENT AND INFORMATION SYSTEM
- Process parameter storage databases: to create, modify or store recipes for on-the-fly download.
- Raw material manager: stored with numerical code and description.
- Blending recipe manager: to create, modify or store blending recipes with numerical code and description.
- Melting profile manager: to create, modify or store melting profiles with numerical code and description.
- Extrusion recipe manager: to create, modify or store extrusion recipes with numerical code and description.
- End product manager: to create or modify coded end products. Each product code is assigned to blending, extrusion and melting temperature recipes.
- Order manager: to create or modify a list of job orders containing useful data for identifying and tracking each order. Each order is assigned a product code.
- Recording of raw material quantity used in the process.
- Totaling by ingredient.
- Recording of alarm events.
- Statistical process analysis (SPC) for blending and extrusion data.
- Data export for further analyses (Lotus, Excel).

REPORTING
- Inventory report viewing and printing: sorting by product code, job order, recipe and date.
- Quality report viewing and printing: sorting by job order.
Aware of customers’ expectations, DOTECO offers various services, with the backup of a highly specialized technical team:

**Technical Advice**
Customer support in taking the right technical decision.

**Spare Part Supplies**
- A fully stocked spare parts warehouse.
- Shipment within 24/48 hours from order receipt.

**E-mail Help Desk**
- Feedback within 24 working hours.
- doteco.service@doteco.com - Assistance for a non-emergency problem.
- doteco.service@doteco.com - Maintenance service.

**After-Sales Service**
- 8 hours per day, 5 days per week:
  - call +39 0535 31809

**Telephone Support**
- 8 hours per day, 5 days per week:
  - call +39 0535 31807

**On-Site Technical Service**
- For emergency: within 24/48 hours wherever you are located.
- Commissioning.
- Maintenance.
- Repairs.

**Remote Assistance**

**In-house Training**
Training of customer personnel: use and maintenance of our units.

**Repairs**
When it’s more convenient to repair instead of replacing.

**Test Laboratory**
At customer’s disposal for testing technical solutions and material handling features.