bandera film

bandera film

blown film lines


B
BANDERA

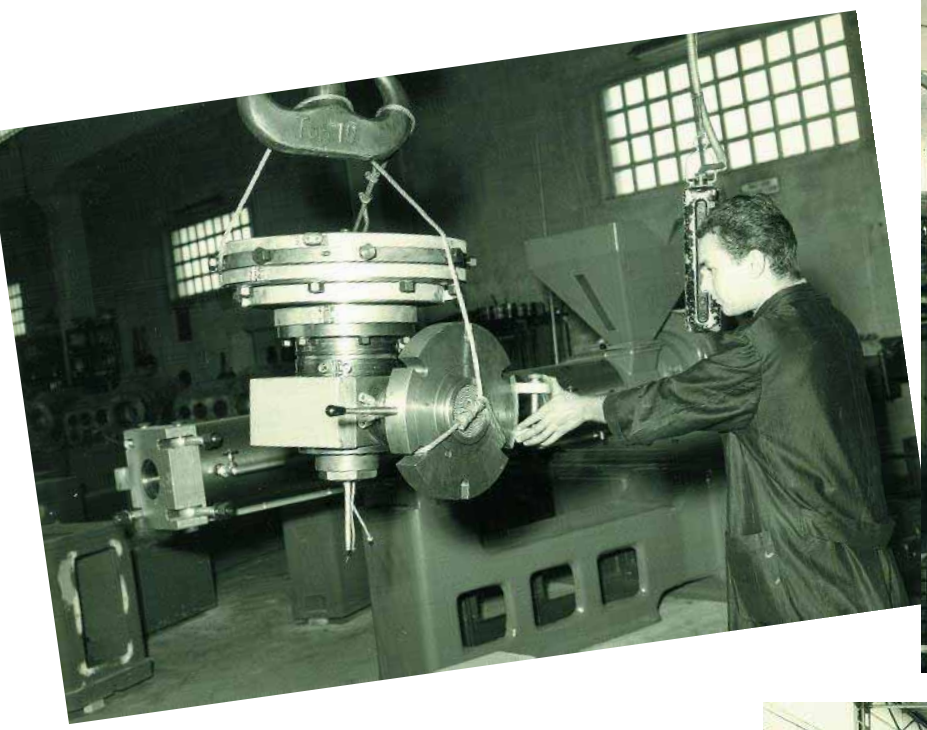
THE HISTORY

The first company name was **"OFFICINA MECCANICA LUIGI BANDERA S.r.l.".** The company has been officially registered by Mr. Luigi Bandera on January 15, 1947 but some "pioneer" extruders had already been constructed by him. The construction year of the extruder No.3 is 1943: it has been reconditioned and at present it can be seen in our premises

The first drawing of our blown film heads we found in our archives dates back 23 February 1952: this is the tangible proof of the deep and preminent interest Luigi Bandera had in the blown film machines; he strongly believed in this sector and therefore concentrated in it all his efforts.

In the years of the economic "renaissance", the demand for blown film equipments grew enormously and it is just in this period that Bandera expands and gives a considerable contribute to the industrialisation of Europe with the sale of thousand equipments.

Quality and customer satisfaction are the key of the success and the result of the seriousness, the devotion and the deep engagement the company founder diffused and trasmitted by creating the Bandera.



Thanks to the continuous technologic improvements and to the sensibility towards the market evolution Bandera , after more than sixty years, can be encountered among the most important constructors and can be considered a reference point in the extrusion world.

The strong competition which features the present market of the blown film equipments led Bandera to create a very specific structure.
An autonomous and product-oriented team consisting of young and qualified people has been created and it is giving to the Company a new technical and commercial inprint based on the quality and on the attention towards the evolution of the product and of the market.
This new organisation enables a continuous and direct contact with the end user and thus the realisation of a dedicated product, always responding to the market exigencies. The designing team consists of "targeted" technicians who can rely on sophisticated and updated Software supports to reckon and simulate the rheologic flux according to the different processing conditions.

The construction is made in our workshop where complete and update machine tools are located.

The finishing and assembling operations are made by our skilled people whose experience has grown in this specific sector, an experience which is being handed on for three generations.

Special attention is being given to the customer care service which in our opinion, along with the quality of the construction of the machines, must keep the first place in the relationship with the client.
The after sale service is given by our spare-parts department which offer a speedy and very efficient assistance


DET NORSKE VERITAS
QUALITY SYSTEM CERTIFICATE
SINCERT

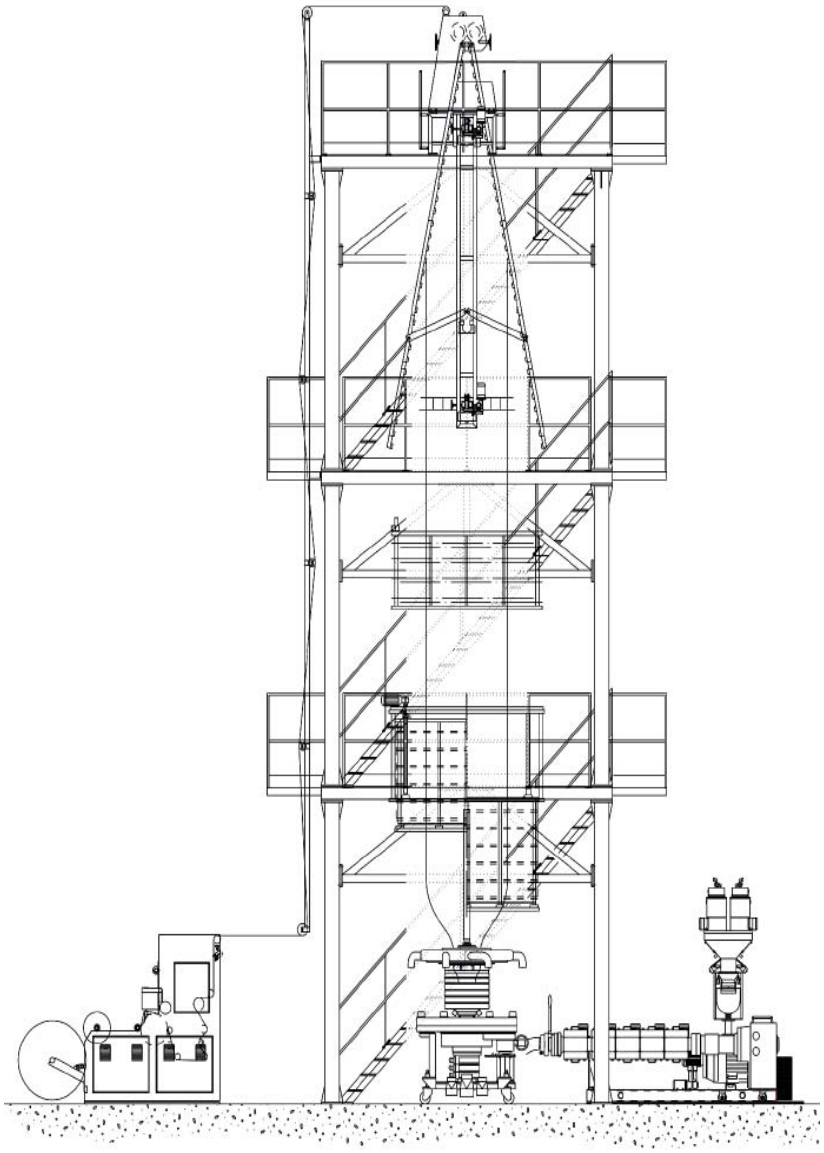
Thanks to the high level of technology we always put in our work, the achievement of the quality certification has been easy.
Since 1998 the Quality System of the Bandera Group is certified by the Norwegian Board DNV
(UNI EN ISO 9001:2000).

THE PROPER SOLUTION FOR YOUR PRODUCT
BAGS AND SACKS

Reliability, line management easiness, low exercise costs, flexibility and quickness in the change-over of the size and the product: these are the main characteristics which a line intended for this application must have. We suggest a mono-layer equipment with small/medium size extruder, with oscillating head, stationary take-off and one-station winding section.

WE HAVE SOLUTIONS FOR EVERY SIZE:

from the very small bag, the classic "carrier bag" and shopper up to the big garbage sack. Even if these are of "simple configuration" lines, they have the same quality properties which marks the most advanced ones from the technologic point of view: barrels and screws coated with anti-wear bimetallic alloy, grooved and interchangeable feeding bush, A.C.motors and top level electronic controls.



On the picture the side sight of a single-layer extrusion line for the manufacture of shoppers or standard bags.
It consists of a Ø 75 mm. extruder, oscillating head with bubble guiding cage, stationary take-off and one-station winder suitable to manufacture a tubular film 1200 mm. wide.
The cooling frame is 7 m. high from the take-off

BIODEGRADABLE AND COMPOSTABLE FILM

The present and more and more incisive attention given to the ambient preservation and the present legislation and standards covering this argument (not only in the western countries) are involving a fast growing diffusion and utilisation of the biodegradable and compostable films, starting from new resins and biopolymers containing vegetable components (such as maize starch) which are suitably transformed to meet the market demand. The reference applications concern the film for the manufacture of shoppers, the diversified collection of organic substances, the food packaging, the hygienic packaging, the agricultural film (mulching film).

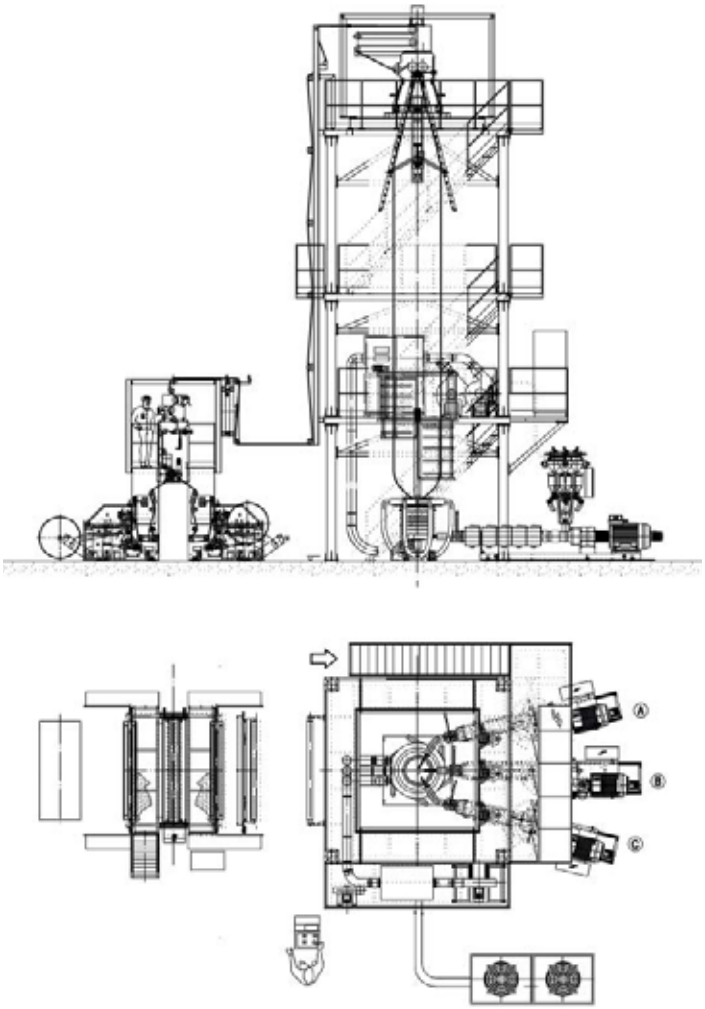
Bandera, by taking benefit from a tight cooperation with the Italian most important producer of bioplastics, has developed a speficic family of mono and multi-layer lines, specifically devoted to the transformation of these new renovable resins.
The "hot" components of the line have been redesigned according to the new rheological characteristics of the resins which are mainly featured by low process temperatures and high operational pressures. Also the cooling ring, a very important component of the line, has been redesigned by keeping into account the unconventional bubble inflating ratios The upper take-off and the winder have been equipped with special devices to avoid the negative tendency of these film to create folds which are hardly removed. The quality standards and the hourly capacity obtained when producing biodegradable films are very interesting and higher than those reached by competitors.
A range of devoted accessories and pheripheral devices complete the line.

The EN 13432 European Specification states in details the compostability characteristics (degradation level under pre-set conditions, in biomass and water) composing a biodegradable resin.

FILM FOR GENERIC PACKAGE
CO.D.Y.FAMILY

The 3-layer CO.D.Y series has been specifically conceived for the manufacture of film for general purpose packaging, carrier bags, multi-reel shrink film (bottle and can labels), film for shrink and stretch cover pallets, for the converting and agricultural industries (mulching).
The CO.D.Y family is the concretization of our idea to supply quality also in those countries where the economic situation does not allow big investments. In few words, innovation to create value, taking into consideration the price factor and keeping the quality unchanged, through a careful work in the designing phase, as well as in the choice of the correct configuration, of the suppliers and partners and fully exploiting the available economies of scale.

In synthesis, we want to enable customers to operate with profit. Later on we realized that this concept was valid not only for the countries with growing economy, but also for more technological markets where the margins are more and more compressed: in these cases it becomes very difficult to find resources for new investments.
At the same time, this is a unique occasion to take opportunity of the "niche", counting on a highly versatile, flexible, reliable and efficient plant, under the best BANDERA tradition.
The saving does not come directly from a reduction in the quality of the parts, but from the concept of commodity, that is of a serial production where all the general costs which traditionally have to be added to a single line, in this case are subdivided amongst a greater number of plants, and the subsequent economy which can be realized at the provisionning stage.

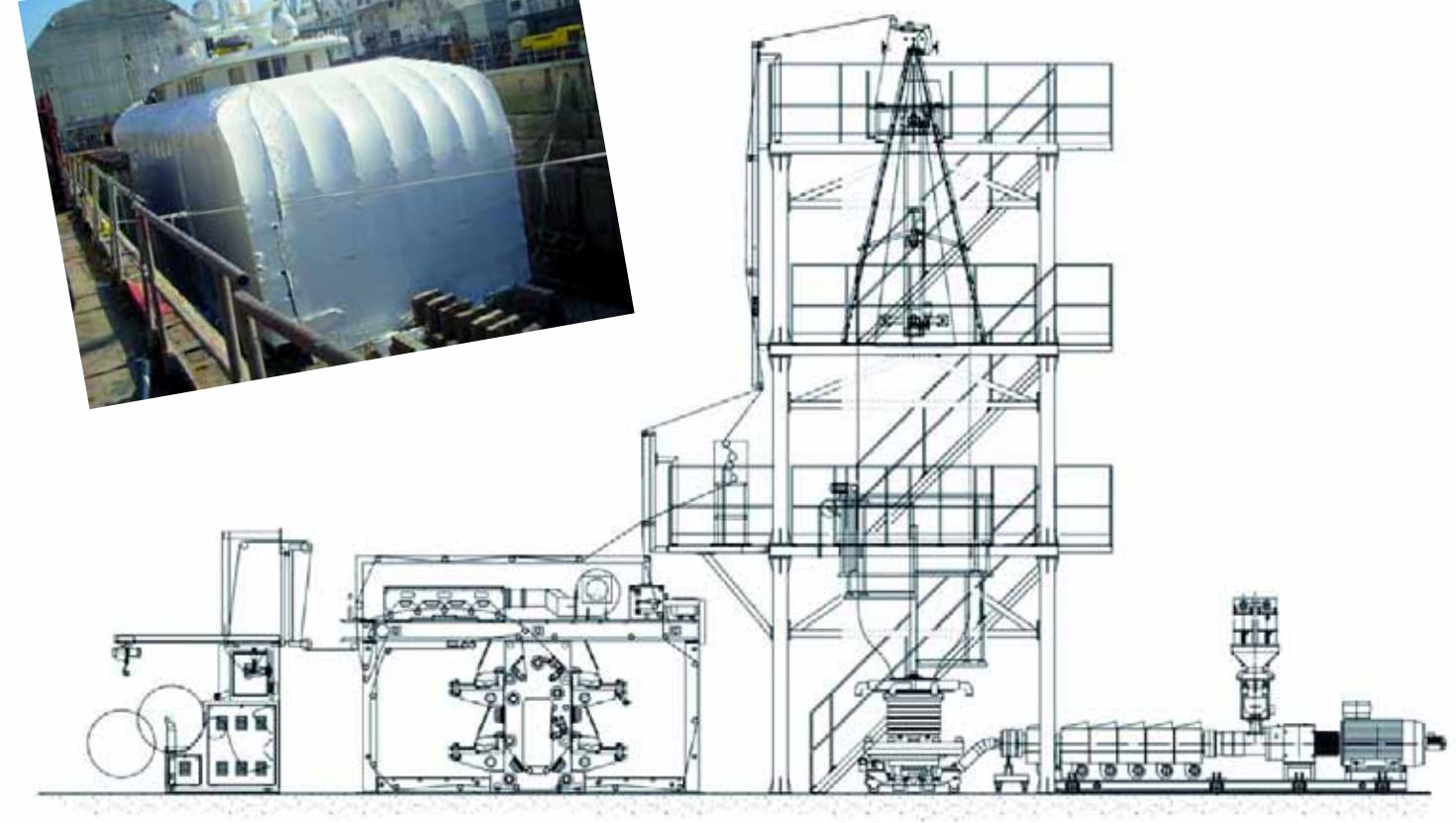


BANDERA offers two different configurations, CO.D.Y 16 for an output up to 350 kg/h and an useful width of 1600 mm and CO.D.Y 22 for an output up to 500 kg/h and an useful width of 2200 mm.

SHRINK FILM & PALLET COVER

The importance of the demand this product has today on the world markets led Bandera to find out new solutions to improve and guarantee the highest production standards and quality.
High output capacity and efficency in getting excellent shrinkable and transparency performances, at relatively low production costs, are our "motto".

The most requested lines have a 3-layer configuration and consist of medium-sized extruders, stationary head with internal bubble cooling device (IBC), oscillating take-off and automatic two-station winder.
We are specialized in the construction of lines totally dedicated to the manufacture of cover pallets, shrink and stretch hoods where the 3-layer oscillating heads can be still supplied.

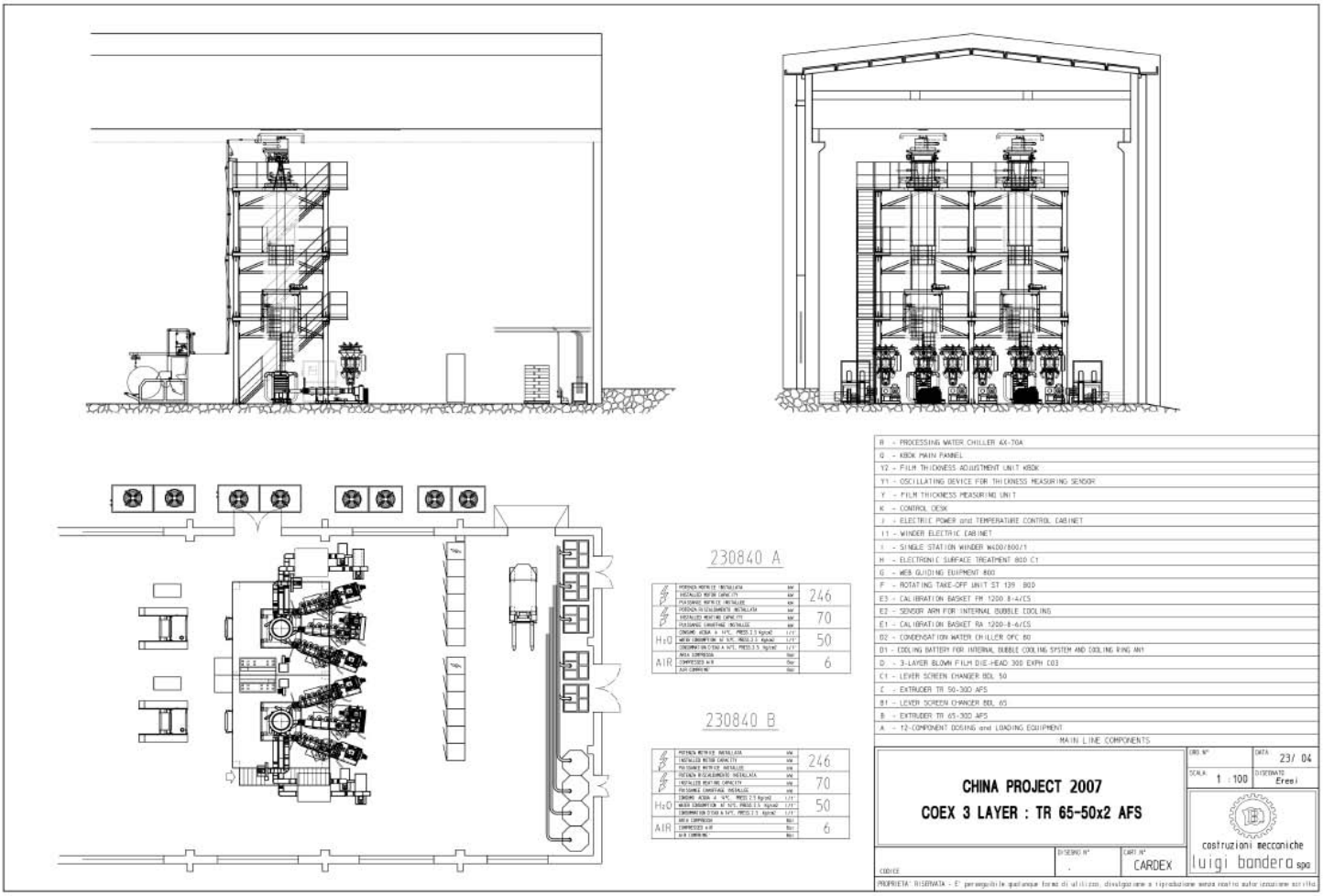


The drawing shows a line for the extrusion of heat shrink & stretch hoods, with a in line 4-colour printing press.

HEAVY DUTY BAGS

The film for the manufacture of heavy duty bags evolved very fast in the last few years. The demand from the end users for more and more sophisticated and quick filling equipments brought to the manufacture of a film with dramatically severe mechanic properties, easy to be processed, welded and printed. This involves high costs which in any case can be cut-off with the use of the coextrusion (where high costs materials are used only where necessary), and with a downgaging in the film thickness thus controlled on a continuous basis to assure high strength to the sack and high capacity outputs.

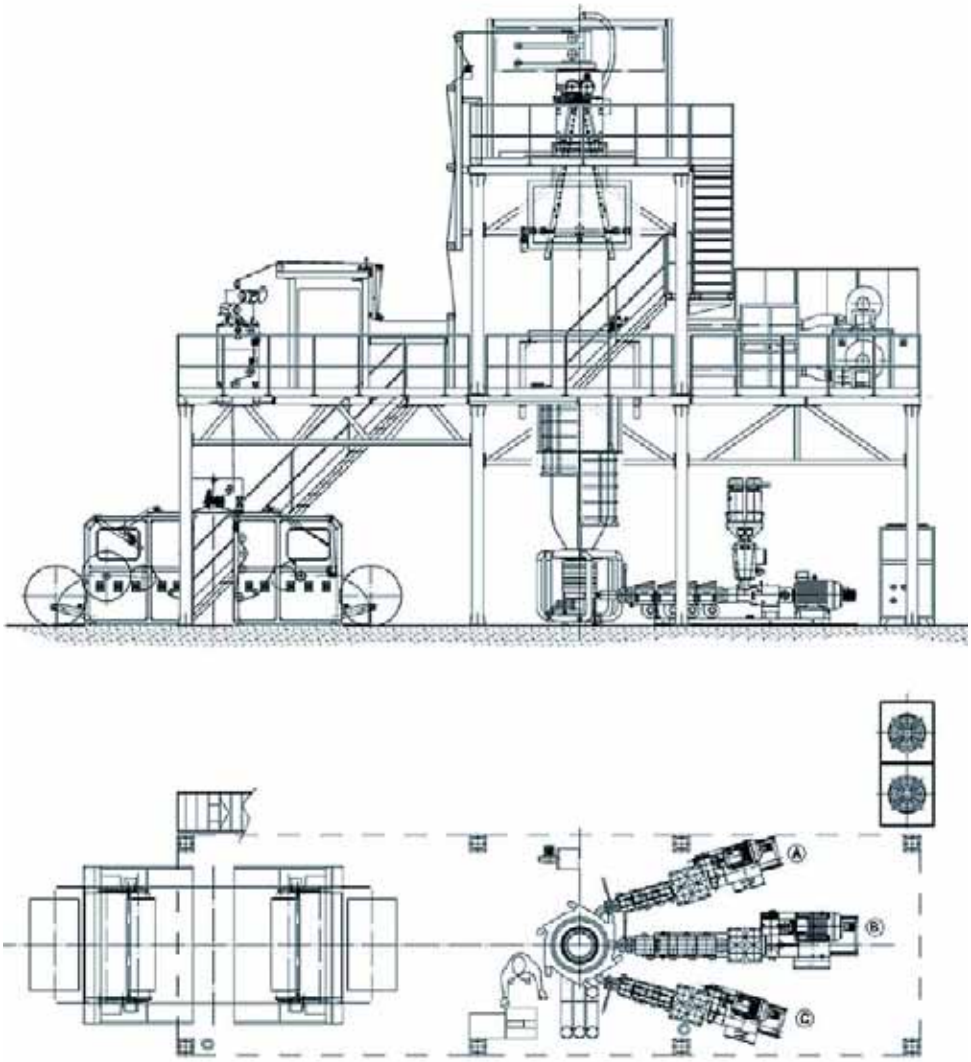
Bandera found a solution to this compromise by designing a "dedicated" line with a capacity exceeding 300 kg/h. The standard line has a 3-layer configuration and is equipped with stationary head (die Ø 170-190 mm with IBC), oscillating take-off and one-station automatic winder for reel Ø up to 1500 mm. In the last few years Bandera supplied a lot of these equipments all over the world, on a turn-key basis, thus gathering great importance and experience unusual for this specific sector.



The "turn-key" project shown above consists of two 3-layer coextrusion lines exclusively dedicated to the manufacture of tubular film for heavy duty bags. The extruders have been dimensioned in relation to the reduced size of the die (Ø 180 mm). In detail, the configuration foresees a more performing middle layer (Ø 75 mm extruder) and two side layers with lower capacity (Ø 50 mm extruders). The head is equipped with internal bubble cooling device to allow an higher capacity. The take-off is oscillating with additional cooling devices and the winder is one-station. The tower frame is 10.5 m. high to last platform.

FILM FOR TECHNICAL APPLICATIONS

We include under this denomination all films having high quality physic properties: films which are subsequently used on high-performing converting lines or films specifically addressed to industrial applications (surface protection films, stretch films etc.)
To obtain these specific characteristics and to assure an high and constant product quality, it is necessary to equip the line at the top, with all the automatic control devices. A special care must be put in the choice of the winder which in this case must have versatility and great precision: a winder with axial or combined axial/contact winding system is needed. The possibility to have the reverse winding system becomes very important when it is necessary to manufacture protection films as well as in the converting application.

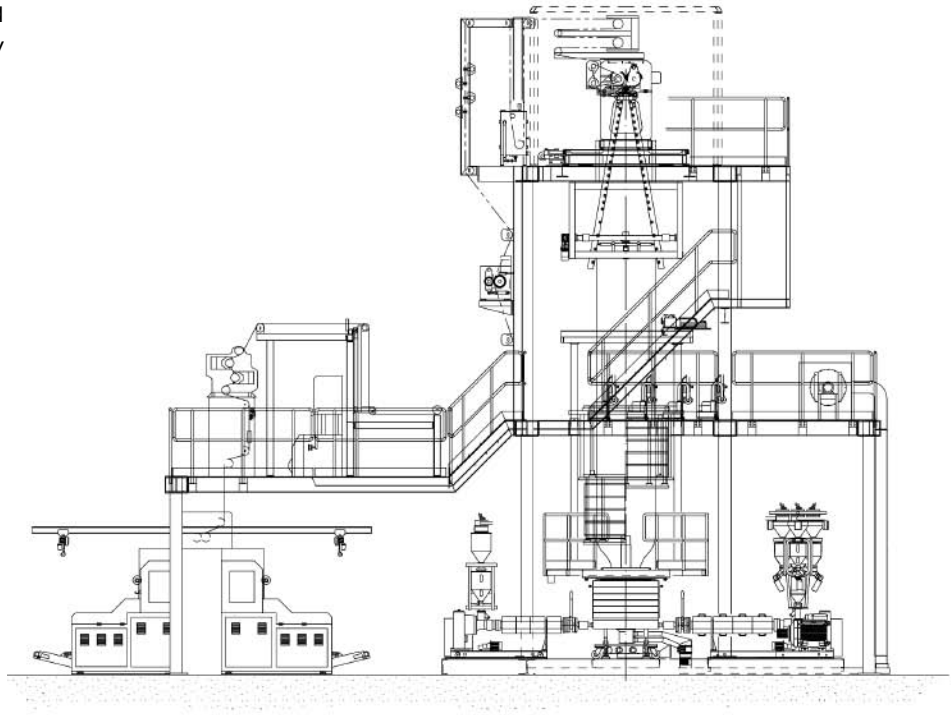


On the left, a lay-out concerning a 3-layer coextrusion line (central extruder Ø 75 mm. - outer extruders Ø 65 mm) with stationary head (internal bubble cooling and Ø 400 mm. die) and with oscillating take-off.
The winder is a two-station type with 2000 mm. rolls, and the tower frame is 11 m. high from the take-off service platform.

5 AND 7 LAYER BARRIER FILM

The main application in the food-packaging and medical field involves the exigency to have very sophisticated technological films. This specific industry places quality and constancy in the quality at the first step in the choice of the supplier.
It is necessary then a tight control of all the processing parameters, starting from the polymer treatments during the "hot" phase of the process.

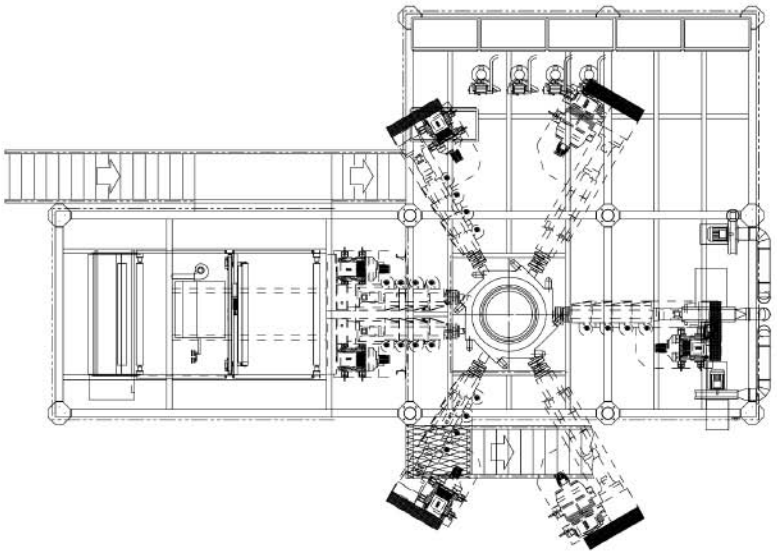
A dedicated geometry of the screw and of the head is essential because it is necessary to guarantee a continuous working cycle without "sector" overheatings resulting from possible sudden increase or decrease of the shear-stress values. The materials commonly used for this application, being particularly thermosensitive, may degenerate. These factors, joined to a thickness automatic control device and to a precise winding system, are the first step to succesfully enter this sector. A concrete help comes from a centralized management of the line which permits an easy traceability of the processing cycles and the creation of an historical file, the starting point to get a complete data base necessary to study new solutions for new products.



The drawing shows a 7-layer coextrusion line for the manufacture of barrier film.

It consists of :

- N° 3 Ø 65 mm extruders for the barrier layers
- N° 2 Ø 35 mm. extruders for the adhesive layers B&F
- N° 2 Ø 75 mm. extruders for the outer layers A&G
- 7- layer stationary head with internal bubble cooling and high efficiency cooling ring
- Oscillating take-off for film 1700 mm. wide max.
- Two-station automatic winder with "gap" system
- Reel Ø 1200 mm. max.



FILM FOR AGRICULTURAL PURPOSES

Luigi Bandera S.p.A. has been one of the first companies able to design a specific line for the manufacture of film for agricultural purposes.
The traditional agricultural film is 4 to 20 m. wide and has a thickness from 120 to 200 µ; it must bear severe climatic conditions.

Lines belonging to this application may have a mono or preferably multi layer configuration. With a 3-layer structure, today it is possible to manufacture film for green houses, minitunnels, ensilage, solarization , mulching; thermal films, photoselective films, heat spreading films.
The possibility to differentiate the mechanical and physical properties, the light and heat transmission of each layer by rationally and economically using the additives and the resins often very expensive, enable a considerable improvement of the film performances and life.

Moreover, the exigency to ensure to the film the requested properties for more agricultural seasons (for instance the anti-drop effect), thus ensuring the constant and uniform specification over periods lasting 3 or more seasons by keeping under strict control the migration among the layers of some additives, has involved in the last few years a strong demand for 5-layer lines with large width.

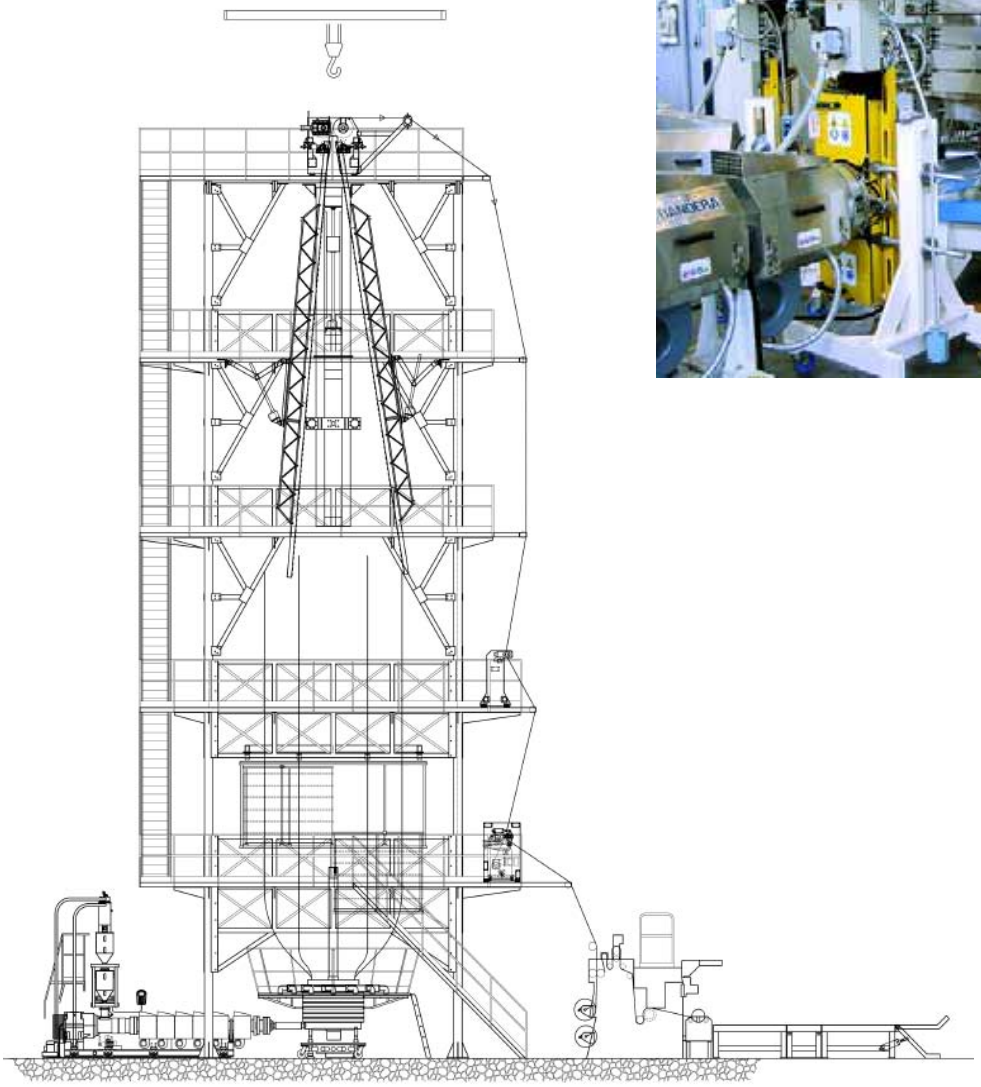
Also the increasing demand for barrier film for agricultural application, such as the fumigation film or V.I.F. (Virtually Impermeable Film) used to fumigate the cultivation field has given a strong contribution to the success of this multi-layer lines and to the recognization to Bandera of the "Excellence" status.

Bandera is today in a position to supply to the main international transformers 3-layer lines for an agricultural film 20 mt wide as well as 5-layer lines equipped with dies up to Ø 1600 mm and 14 mt. wide (see photo on the left).
The largest coextrusion heads never built in the world, with designing, construction and performance properties really innovatory and unique!

The flexibility and versatility featuring Bandera's lines are more and more appreciated by customers dealing with the agricultural film, a product strongly tied up to the seasonability factor.

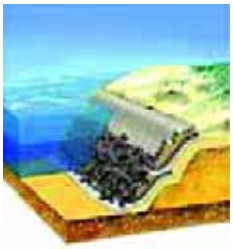
This has involved the exigency to supply lines able to manufacture, with the same coextrusion head and with short set-up times, both agricultural film and higher thickness films such as geomembrane for water-proofing applications, so as to cover in a profitable manner the productive capacity of a line under 12 months.

The stationary takes-off composing the line can reach a width of 8.000 mm for the agricultural film and 5.500 mm for the gusseted film, with motor-driven conveying panels and side gusseting traingles;
The winder series is very large and includes complete automatic machines for the production of jumbo reels as well as winders of the shaft-less type for the direct winding on the cardboard or PVC cores of short length reels.

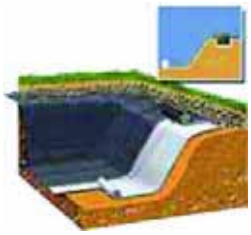


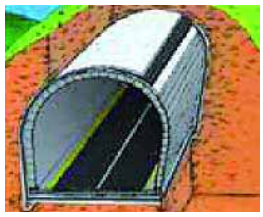
All the lines are equipped with the latest accessories for the totally automatic funtioning. We supply also 8 folding devices (trapezium type) to facilitate the reel handling and stocking operations, devices for the manufacture of film with different thickness at the edges and in the middle (such as film for vineyards) and systems to apply stiffening strips of different material.

GEOLINERS



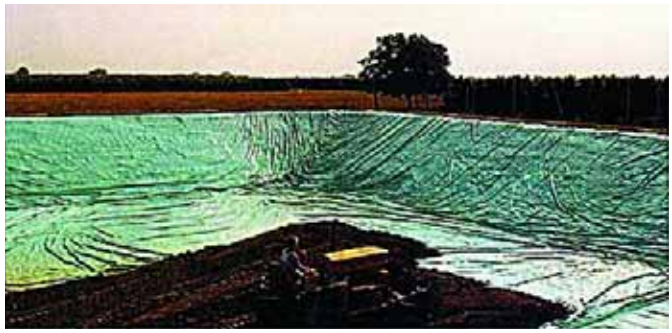
For sure the most particular and sophisticated product in the blown film sector, with unusual characteristics.
The classic utilisation is the impermeabilization of the ground, the lining of waste dumping fields or the construction of water reservoirs, water basins, irrigation channels, extraction mines, consolidation of river and sea waters, dam protection etc.





The standard configuration includes one large-size extruder for the inner layer and two small-size extruders for the outer layers.
The required thickness is extremely high, starting from 0.5 up to 3 mm. and the width may reach 6-8 m.

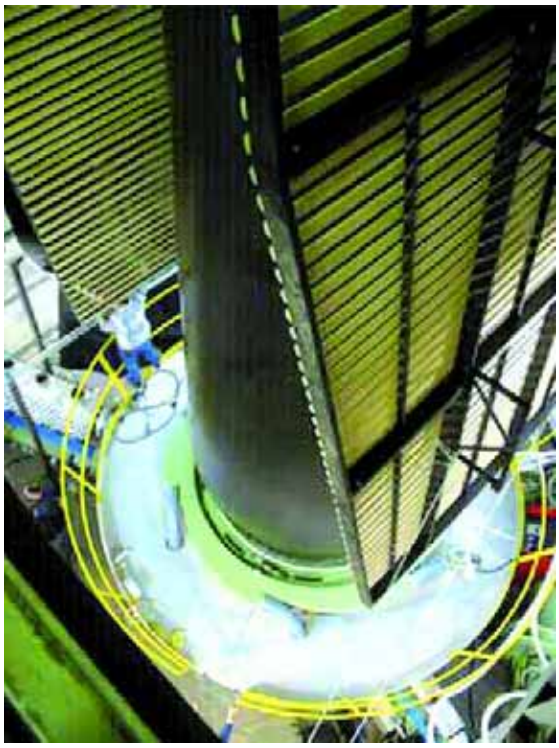
On demand, it is possible to insert a texturized surface to get high-friction zones and prevent the film slitting on sloping soils.



The blown film is submitted to a slight bi-orientation both transversal and in the machine direction, which strengthens the mechanical proprieties

A standard line consist of a large size extruder for the inner layer and two small size extruders for the outer layers.

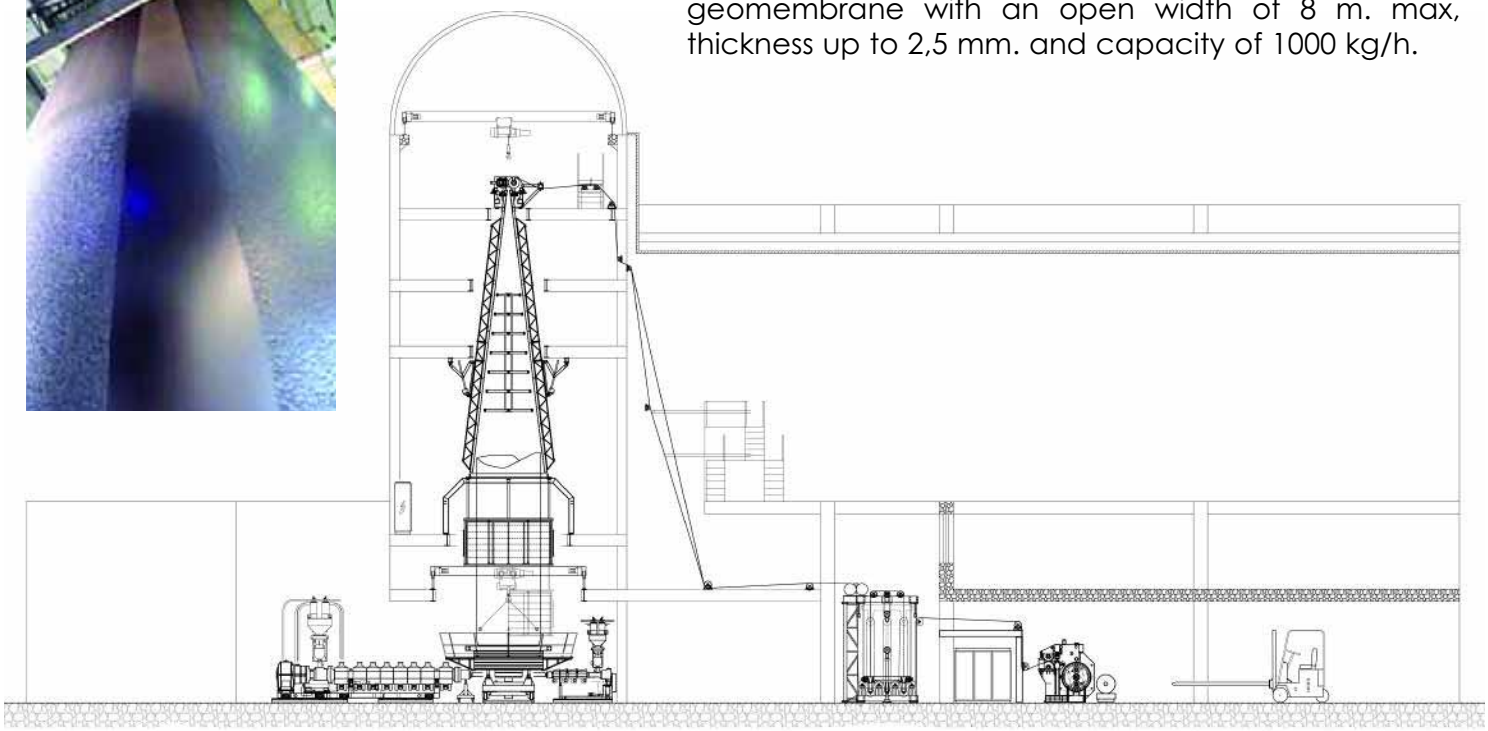
The head is always equipped with the internal bubble cooling system and the fans are oversized to exasperate the cooling properties. Take-off and winder are of big dimensions and fully automatic.



The extrusion head is of the 3-layer type with Ø 2300 mm die, with spiral channels got with the aid of specific software and modern CAD/CAM machines.
Special care is given to the cooling ring which is high-efficient and has excellent cooling properties.
Take off of the Nip-Roll type, wooden or steel flattening and gusseting devices independently motor-driven, with variable geometry tips.
Automatic winder with automatic extraction of the steel mandrel from the finished reel.

Control panel with PLC for the management of the winder cycle parameters, operator interface by 5" colour LCD touch screen.

The layout hereunder shows a line to manufacture geomembrane with an open width of 8 m. max, thickness up to 2,5 mm. and capacity of 1000 kg/h.



MAIN LINE COMPONENTS

The range of extruders manufactured by **BANDERA** is the largest and the most complete one can find on the market; a new series of extruders specially conceived to meet the specifications of blown film lines has been added to the standard one.

When thinking to this new series, two were the targets to be reached : reduced maintenance need and energy saving.

The extruders belonging to the **TRW** series have special performance characteristics: excellent material plasticization with excellent homogenisation properties, very high thermal efficiency and considerable reliability coming from an ultra-decennial experience.

The gearboxes assembled on the extruders are conceived and constructed for the specific use. Their dimensioning is done according to the **BANDERA** standards and tradition.

NO COMPROMISES ON QUALITY.

Our decision to install A.C. motors dates back many years ago and in the name of this philosophy we are going on supplying these motors in the standard execution. Advantages are an easy tracing and maintenance. An additional and important advantage can be found in the possibility to use motors belonging to the efficiency class EFF 1 which enables a considerable energy saving.

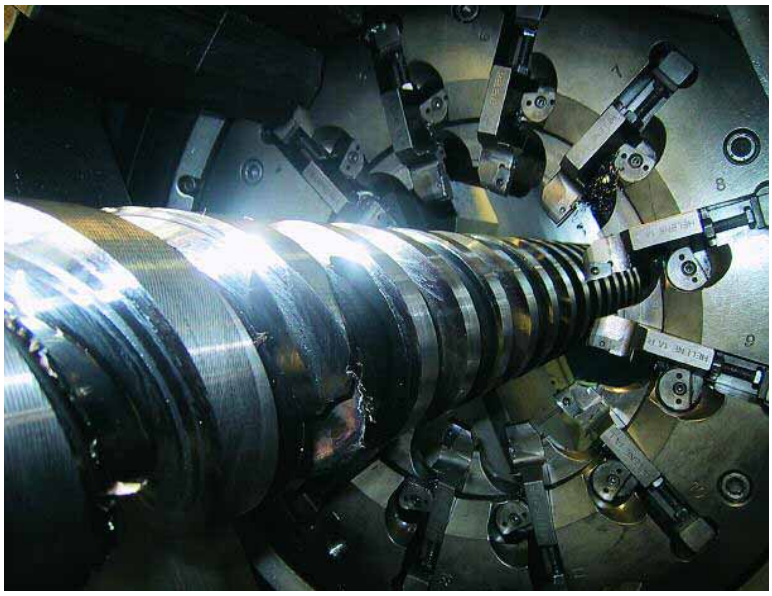
The feeding bush is always interchangeable and the geometry of the grooves differs according to the materials to be extruded and to the geometry of the screw.

Special care has been devoted to the screw and barrel wear issue which is becoming more and more exasperated due to the metallocene catalysts at present used in the production of polymers. For this reason, our extruders are equipped with barrels coated with special low wear bimetallic alloy (REILOY 121) which guarantees a very strong resistance to the wear and therefore a "long life".

As to the screws, we adopt a special advanced technology consisting in the application of special alloys on the screw thread by means of special automatic machines and with a precise method which enables the achievement of a very high quality level.

EXTRUDERS

A separate but still important chapter is to be devoted to the screw geometry. A large choice of polymers are today offered by the raw material producers. The film manufacturers may intervene on the structure of the film to get the techno-economic features requested by the customers.
Not to disregard this trend, **BANDERA** designs the screws with advanced computer softwares and with rheologic analysis programs in tight co-operation with the raw material suppliers. The result is a constant evolutive improvement which is the target of our study and which is constantly verified with tests made under the real processing conditions. The screw profile we got has given excellent results also from the energy saving point of view.

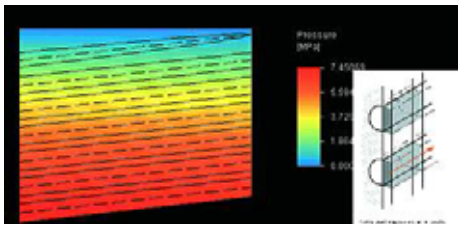


EVP
It is the extruder series specially conceived for the 5 and 7-layer coextrusion equipments where the screw extraction is made from the rear side.
Easy and fast screw changes and maintenance are in this way assured.

MODEL		35 S	50 AFS	65 AFS	75 AFS	85 AFS	100 AFS	120 AFS	140 AFS	160 AFS	180 AFS	200 S
Screw Diametre	mm	35	50	65	75	85	100	120	140	160	180	200
L/D ratio		28	30	30	30	30	30	30	30	30	30	30
Heating zones	NR.	3	4	4	4	5	5	6	7	7	8	9
Driving motor	kW	15	45	75	90	132	160	250	325	372	450	500
Output with LDPE	Kg/h	25	100	180	250	300	400	500	700	850	1150	1400

HEAD

The **BANDERA** old tradition and great experience has been today integrated with the most modern and sophisticated designing techniques: the functioning of each head is simulated with the customer's reference materials, a rheologic analysis is made and an effective customerisation of the geometry of the distribution channels is obtained.
The designing foresees the use of high-quality special steels treated to accurate stabilisation which assure to the head long life and constant quality.
The construction is made in our workshops with the aid of modern machine tools. High precision and reliability are in this way assured.

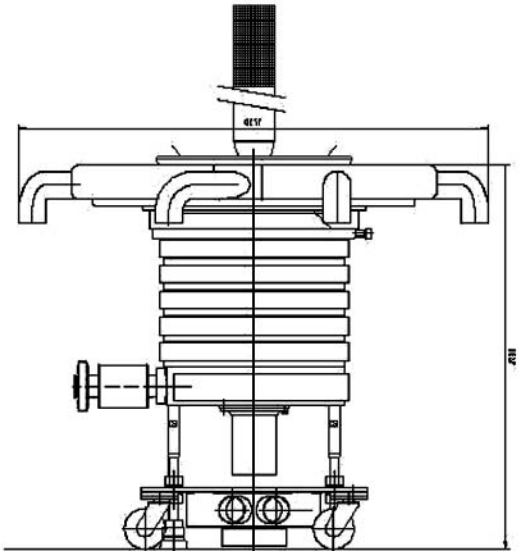


The finishing and assembling operations are made by our skilled personnel whose experience in the field started three generations ago. The range of heads Bandera can supply is among the largest, as to characteristics and sizes, one can find on the market: it comprises stationary and oscillating heads, with and without internal bubble cooling, with central and side feeding system, from one to seven layers, with die Ø ranging from 30 to 2600 mm.

The world largest 5 layers head!!! Die ø1.600 mm suggested to manufacture barrier film for agricultural purposes max open width 14,5 m

SINGLE-LAYER HEADS

Thanks to the positive results obtained with the multi-layer heads of the EXPH series, Bandera decided to apply the same constructive concept to the single-layer heads by creating the new MOEX series.
The innovations introduced enable a cut-off of the dimensions with the result of a better and easier line control and management.
The side feeding involves a cut-off of the inside volumes with the subsequent reduction of the melt residence time. The special geometry gives the possibility to have larger air channels and therefore a stronger efficiency on the internal bubble cooling.



CF SERIES: These are the standard single-layer stationary heads with central feeding system and spiral distribution. The die range starts from 30 mm. chosed for laboratory lines up to 2600 mm. used for agricultural film lines.

ACH/I SERIES: Single-layer stationary heads with central feeding and spiral distribution, equipped with internal bubble cooling system.With the introduction of the MOEX heads, the latter two series are mainly used for the production of film for agricultural purposes starting from die with 800 mm diameter.

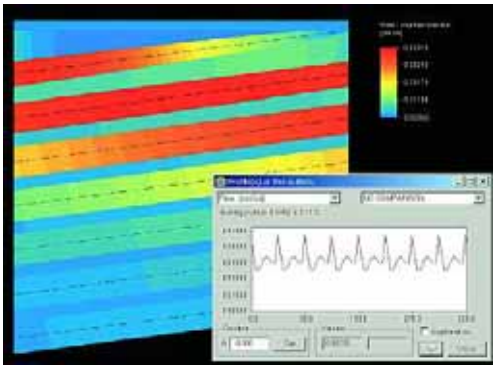
CFR SERIES: This is the oscillating version of the CF series. The main characteristic of this head is the considerable reliability of the sealing system of the rotating group.

ACHR/I SERIES: This is the oscillating version of the ACH/I series, equipped with internal bubble cooling. These heads are suggested when films with deep gussets are requested.

STATIONARY	STATIONARY WITH IBC	OSCILLATING	OSCILLATING WITH IBC	DIE RANGE	COOLING RING
Model	Model	Model	Model	mm.	Model
80 CF		80 CFR		30 ÷ 120	AR 3-12
3/15 CF		3/15 CFR		60 ÷ 150	AR 6-20
150 CF		150 CFR		60 ÷ 200	AN 1
250 CF		250 CFR		100 ÷ 300	AN 1
MOHI 250	MOEX 250	18/30 ACH/R	18/30 ACH/I /R	150 ÷ 300	AN 1 / AN 2
MOHI 400	MOEX400	450 ACH/R	450 ACH/I/R	300 ÷ 500	AN 2
MOHI 500	MOEX 500	35/60 ACH/R	35/60 ACH/I/R	400 ÷ 600	AN 2
800 ACH	800 ACH/I	800 ACH/R	800 ACH/I/R	700 ÷ 900	AN 3
1000 ACH	1000 ACH/I	1000 ACH/R	1000 ACH/I/R	1.000	AR 100-120
1200 ACH	1200 ACH/I			1.200	AR 100-120
1400 ACH	1400 ACH/I			1.400	AR 140-160
1500 ACH	1500 ACH/I			1.500	AR 140-160
1600 ACH	1600 ACH/I			1.600	AR 140-160
1800 ACH	1800 ACH/I			1.800	AR 160-200
2000 ACH	2000 ACH/I			2.000	AR 160-200
2200 ACH	2200 ACH/I			2.200	AR 220-240
2400 ACH	2400 ACH/I			2.400	AR 220-240
2600 ACH	2600 ACH/I			2.600	AR 240-260

3-LAYER HEADS

EXPH SERIES: This is the "heart" of the new-born series of coex heads (3, 5 and 7 layers) with side feeding.
Specially conceived to assure the shortest residence time, it enables a precise control of the melt temperature and gives the possibility to process also the most thermo-sensitive materials avoiding thoroughly degradation or gelling events.
The quick cleaning characteristic when changing the material offers to customers a considerable economic advantage. The total absence of overheatings involves an higher and more stable capacity and the thermo-insulation system among the different layers enable a thorough check also when "critical" materials are to be used. Thanks to the special feeding configuration, the internal bubble cooling system can be provided with larger channels which strenghten the thermal exchange and increase the cooling capacity.
The consequent room available gives the possibility to correctly insulate the pipings of the cooling air and to neutralize each negative influence on the thermoregulation of the inside parts of the head. The modern and high-tech quality of these heads are confirmed by the accurate precision in our construction schemes on one side and by the positive feedback coming from our customers and from the market on the other.

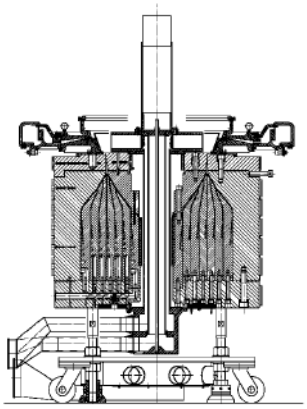


On request, when we are asked to supply lines totally devoted to the manufacture of cover pallets, shrink and stretch hoods, it is possible to construct the 3-layer oscillating heads belonging to the **ACH3R/I** old series.

STATIONARY	STATIONARY WITH IBC	OSCILLATING	OSCILLATING WIHT IBC	DIE RANGE	COOLING RING
Model	Model	Model	Model	mm.	Model
HIPH 200 CO3		100-200 ACH3 R		100 ÷ 250	AN 1
HIPH 300 CO3	EXPH 300 CO3	18/30 ACH3 R	18/30 ACH3I/R	160 ÷ 400	AN 1
HIPH 400 CO3	EXPH 400 CO3	400 ACH3 R	400 ACH3I/R	250 ÷ 500	AN 1
HIPH 500 CO3	EXPH 500 CO3	40/60 ACH3 R	40/60 ACH3I/R	400 ÷ 650	AN 2
HIPH 700 CO3	EXPH 700 CO3			600 ÷ 800	AN 3
HIPH 900 CO3	EXPH 900 CO3			700 ÷ 1.000	AR 100-120
80/120 ACH3	80/120 ACH3/I			800 ÷ 1.200	AR 100-120
140/160 ACH3	140/160 ACH3/I			1.400 ÷ 1.600	AR 140-160
160/180 ACH3	160/180 ACH3/I			1.600 ÷ 1.800	AR 140-160
180/200 ACH3	180/200 ACH3/I			1.800 ÷ 2.000	AR 140-160
1800 ACH3	1800 ACH3/I			1.800	AR 160-200
2000 ACH3	2000 ACH3/I			2.000	AR 180-200
2200 ACH3	2200 ACH3/I			2.200	AR 220-240
2400 ACH3	2400 ACH3/I			2.400	AR 220-240

5 & 7 LAYERS

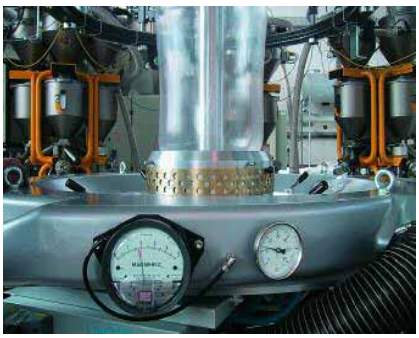
The exigency to design a particularly innovative and modern head which combined the high quality characteristics to an extreme flexibility, oriented us to the construction of the series **EXPH 5 & 7** layers. The results got have been excellent : these heads can "space" in the whole range of barrier resins, in each processing condition and with amazing results. The utilization of barrier materials such as PA (in all its variants) and EVOH has never been so easy. Thanks to the precision in the construction, to the aid coming from the thermo-insulation systems among the layers and to the efficiency of the air cooling system, the line control, capacity and the product quality are fully guaranteed. The stiffness properties which are typical of these special projects enable an extreme residence time of the materials inside the head. This condition is a must for processing in a constant and continuous basis thermosensitive materials such as EVOH and ionomers, specially with dies of big dimensions.



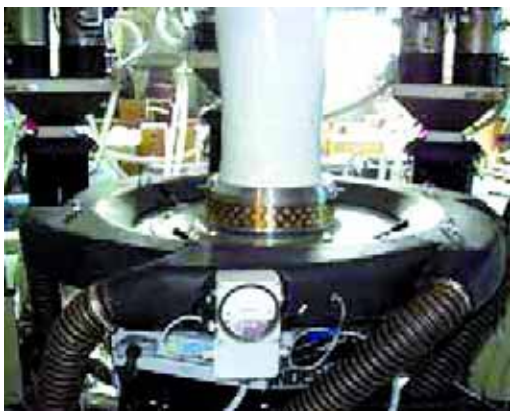
5 LAYER	IBC	DIE RANGE	COOLING RING
Model		Ø mm.	Model
HIPH 200 CO5	NO	150 - 250	AN 1
HIPH 300 CO5	NO	250 - 350	AN 1
EXPH 400 CO5	YES	300 - 400	AN 2
EXPH 500 CO5	YES	450 - 550	AN 2
EXPH 600 CO5	YES	600 - 700	AN 3
EXPH 800 CO5	YES	750 - 850	AN 3

7 LAYER	IBC	DIE	COOLING RING
Model		Ø mm.	Model
HIPH 400 CO7	NO	200 ÷ 400	AN 2
EXPH 500 CO7	YES	450 ÷ 600	AN 3
EXPH 700 CO7	YES	600 ÷ 800	AN 3
EXPH 900 CO7	YES	800 ÷ 1000	AR 100 - 120

COOLING RINGS



The cooling ring is a very important element in the composition of a blown film line: it defines the quality and the quantity of the extruded film. The cooling rings manufactured by Bandera give excellent performances. With the dual-flow principle they allow a very precise control of the bubble stability and a particularly high output with low thickness tolerances. The introduction of an additional Venturi ring increases the cooling efficiency and the bubble stability also when processing materials with very low melt strength. Another important consideration: the Bandera cooling rings can work togheter with the most advanced and efficient thickness automatic control systems (see automation).

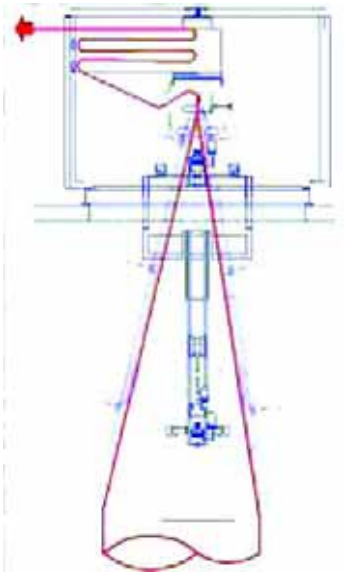


TAKE-OFF UNITS

The Bandera range of oscillating takes-off consists of two models:

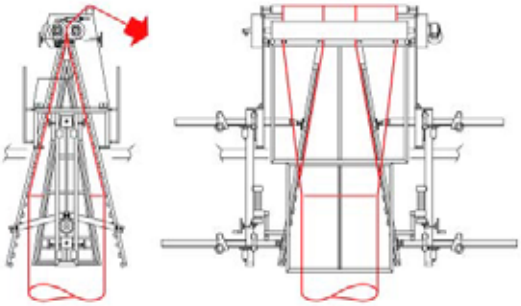
NSO SERIES:
coming from a design specifically studied for high-quality equipments. The extremely strong, high precision construction and the 360° oscillation on large dimension thrust bearings enable long-life performances.
Each processing cycle is constantly under control: the oscillation is made through A.C. motor and the drive transmission through pinion and circular rack.
The oscillating speed, the acceleration and deceleration, the reverse dead times, all is set through the main line PLC.

ST SERIES:
coming from a traditional design they are a valid alternative to the NSO types.
Thanks to their technical features, they are suggested to complete high-size equipments because they can be easily equipped with deep gusseting systems necessary when an extremely flexible line is requested.
The considerable success reached in the last years is a guarantee of security and reliability out of all comparison.



The flattening devices assembled on this series vary from the traditional wooden slats, covered if necessary with low friction profiles, to the classic aluminium or carbon fiber rolls with high sliding properties or to the rolls lined with "anti-stick" material. In addition, the flattening devices can be equipped with a special attachment which gives the possibility to use alternatively both the wooden slats and the rolls.

To meet the most severe requests, this take-off can be equipped with additional accessories, the most important of which are additional cooling cylinders, an additional take-off and special treatments for sticky films.

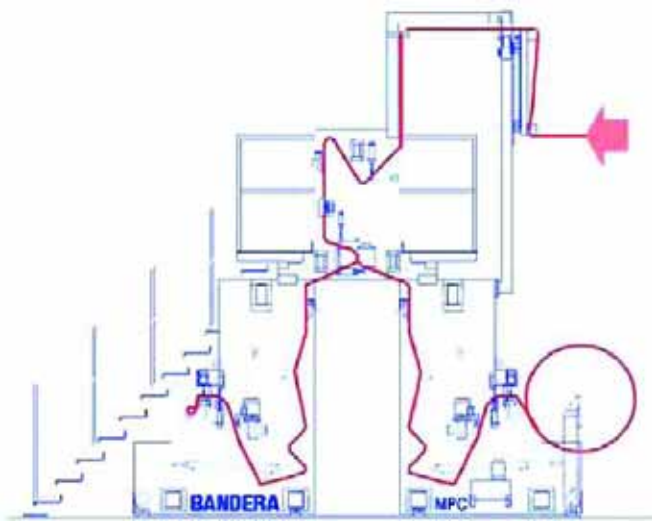


Our production includes also classic stationary types ranging from narrow widths (800 mm) up to the film for agricultural purposes of great dimensions (3500 mm).
They offer a very accurate precision in the pulling force and therefore a considerable solidity and precision evolving to an easy line management and maintenance.

AUTOMATIC WINDERS

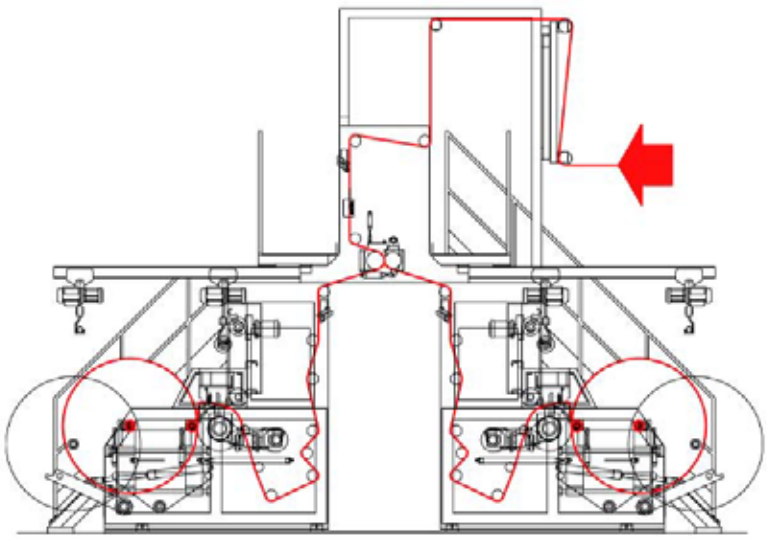
The standard range consists of 3 models:

MPC: This is the base type of our automatic winders.
Main characteristics: two-station back to back configuration with central operator passage by foot step, winding mandrel supported by levers the function of which is also to discarge the finished reel on floor.
The winding tension is controlled by loading cell and the winding cycle is controlled by PLC with digital display control board.
It is a reliable winder which gives good performances for all type of films, for general packaging purposes.
It is available also in the opposed version with entry calender and upper bridge with two symmetric stations (MPX model).



ESR: This is the top model of our automatic contact winders. Its bridge configuration with central passage in the lower position enables easy operator movements and quicker assistance. The top service platform enables the housing of some important accessories such as the corona treating units or the micro-perforating units. The winding mandrel slides on flat guides which enable the perfect control of the winding pressure.
This winder accepts from 3" to 6" mandrels.
It is possible to obtain with this winder reels of Ø up to 1500 mm.
It is suggested for all films not specifically requiring axial winding.
It is particularly suitable for films with medium/high thickness, also with deep gusseting or multi-split reels.

ESR 9000: This is our top model which allows 3 different type of winding :
• Surface drive winding on rubberised roll Ø 477 mm. controlled by A.C. motor and with adjustment of the film tension through high-sensitive loading cell.
• Axial winding with mandrel driven by brushless motor and constant gap between contact roll and winding reel. The winding tension is electronically adjusted by "tapering tension control" algorithmical calculation.
• Combined winding by using the two above methods contemporarily.



A great flexibility comes also from the function of the reverse winding sense.

Controls are operated through touch-screen colour display.

This winder represents the perfect solution when high-level quality targets (ex. high-speed converting) or when processing film with particular critic characteristics (stickness and elasticity) are requested.

	MPC	ESR	ESR 9000
WINDING METHOD	Contact	Contact	Contact - Axial - Combined
Ø CONTACT ROLL	318 mm	400 mm	477 mm
N° STANDBY MANDRELS	1	2	2
SYNCHRONISM WITH TAKE-OFF	Dancing roller with linear potentiometer	Loading cell	Loading cell
WINDING TENSION CONTROL	Loading cell	Loading cell	Loading cell
DISCHARGE ON FLOOR	Winding arms with hydraulic drive	Independent arms with hydraulic drive	Independent arms with hydraulic drive
Ø WINDING MANDRELS	3"	3",4", 5", 6"	3",4", 5", 6"
MAX. REEL DIAMETER	1000 mm	1200 mm (1500 mm on demand)	1200 mm (1500 mm on demand)
DRIVE	A.C.	A.C.	A.C. + brushless on axial drive
WINDING CYCLE CONTROL	PLC	PLC	PLC
OPERATOR INTERFACE	One-colour display LCD	Multi-colour Touch Screen LCD (5")	Multi-colour Touch Screen LCD (5")

AUTOMATION

The centralized control of all the line parameters, this is the frequent request of the present market for different reasons:

- New equipments are more and more sophisticated, therefore difficult to manage and with a lot of elements.
- to be checked.
- The labour is more and more expensive.
- The Quality Systems require the traceability protocol of the product.
- The exigency of interconnection with the company network (integrated production management systems).

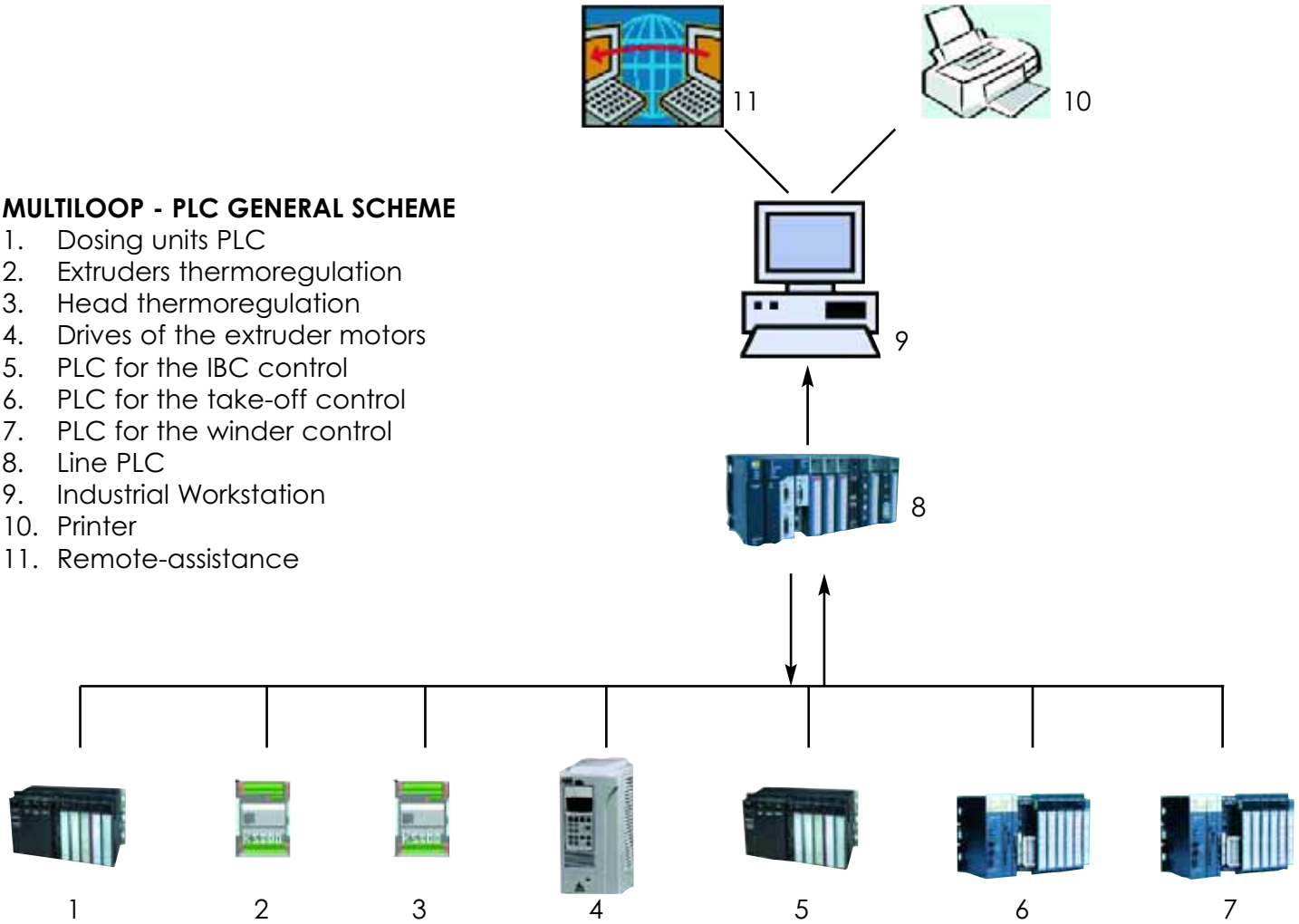
To meet these exigencies, BANDERA has developped a specific control "architecture":
This system is based on an industrial workstation operating in Windows platform, interfaced with the line master PLC which is linked, through field bus, to the control PLC of each element composing the line.
The result is the visualisation of all data relating to:

- Digital drives of the extruder motors.
- Thermoregulation unit of the extruders and the head.
- PLC control of the IBC system.
- PLC management of the take-off and winder cycles.
- Control module of the main accessories composing the equipment.

Thanks to this architecture, all the line parameters are ready to accept remote connections, if requested, relating to the production control, the raw material management or the remote assistance from our technicians.
Special care has been taken when designing the operator interface, starting from the choice of the hardware which is made on a large, colour monitor. For the screen pages, a very exhaustive user friendly graphics has been used on which the operator intervenes by using only the "touch-screen".

MULTILOOP - PLC GENERAL SCHEME

1. Dosing units PLC
2. Extruders thermoregulation
3. Head thermoregulation
4. Drives of the extruder motors
5. PLC for the IBC control
6. PLC for the take-off control
7. PLC for the winder control
8. Line PLC
9. Industrial Workstation
10. Printer
11. Remote-assistance

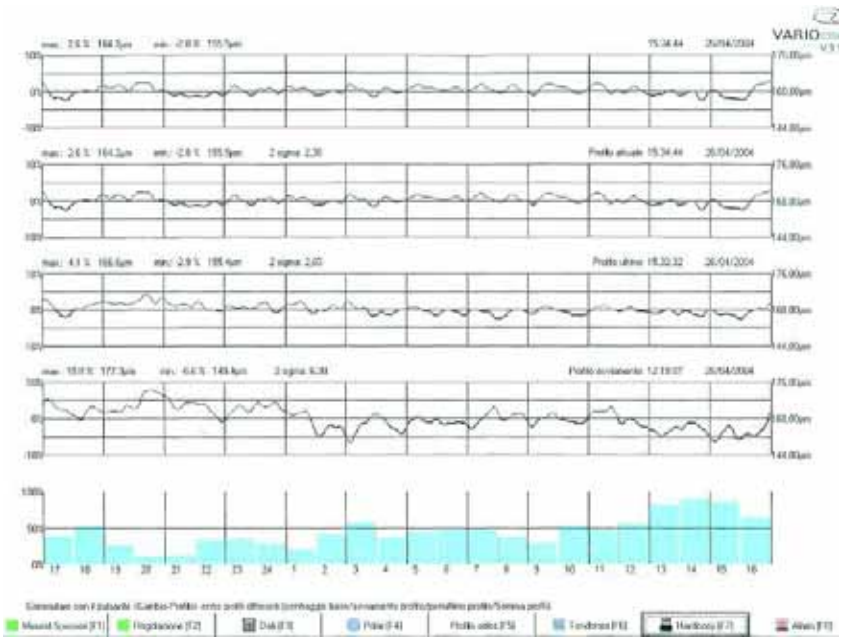


ACCESSORIES

The accessories fitting a blown film equipment today have a top level importance. Their main function is to raise the quality and to reach a perfect construction precision of the product, by reducing at the lowest level the operator influence.

A modern extrusion line cannot be taken into consideration without a constant and accurate control of the raw materials, also because the formulations at present used for a standard coextruded film contain a considerable quantity of different materials and additives. For this reason, the raw material data management to guarantee the traceability and the repeatability of the product and to control the production costs is a must:
Bandera realizes these controls integrated to the line supervisor and offers in this way a thoroughness of information with a complete storage file and a total control of the product management.

Just in the last few years, the market is focusing its attention towards the " high quality" film.
For this reason, nearly all the lines we deliver are equipped with an automatic system to control and adjust the thickness.
Our system is based on a capacity sensor (or radio-isotope type when using complex coextrusion structures with PA or EVOH) assembled on a circular rail rotating on the bubble before the flattening process on the take-off starts.
The sensor is interfaced to an air adjusting system which operates with independent air streams. By varying the cooling strength of the melted material on each air adjusting channel, a film thickness adjusting effect is achieved. The results obtained have been very interesting in relation to the thickness tolerances and the stabilisation properties of the thickness profile.




B
BANDER

CAT. FILM/ING - 10/07

www.camimm.it

Costruzioni Meccaniche Luigi Bandera S.p.A.
C.so Sempione, 120 | 21052 Busto Arsizio (VA) ITALY
Tel. +39 0331 398111 | Fax +39 0331 680206
E-mail: lbandera@lbandera.com | ***www.luigibandera.com***

COMPANY
WITH QUALITY SYSTEM
CERTIFIED BY DNV
=ISO 9001/2000=