



Advanced
Automation
Systems



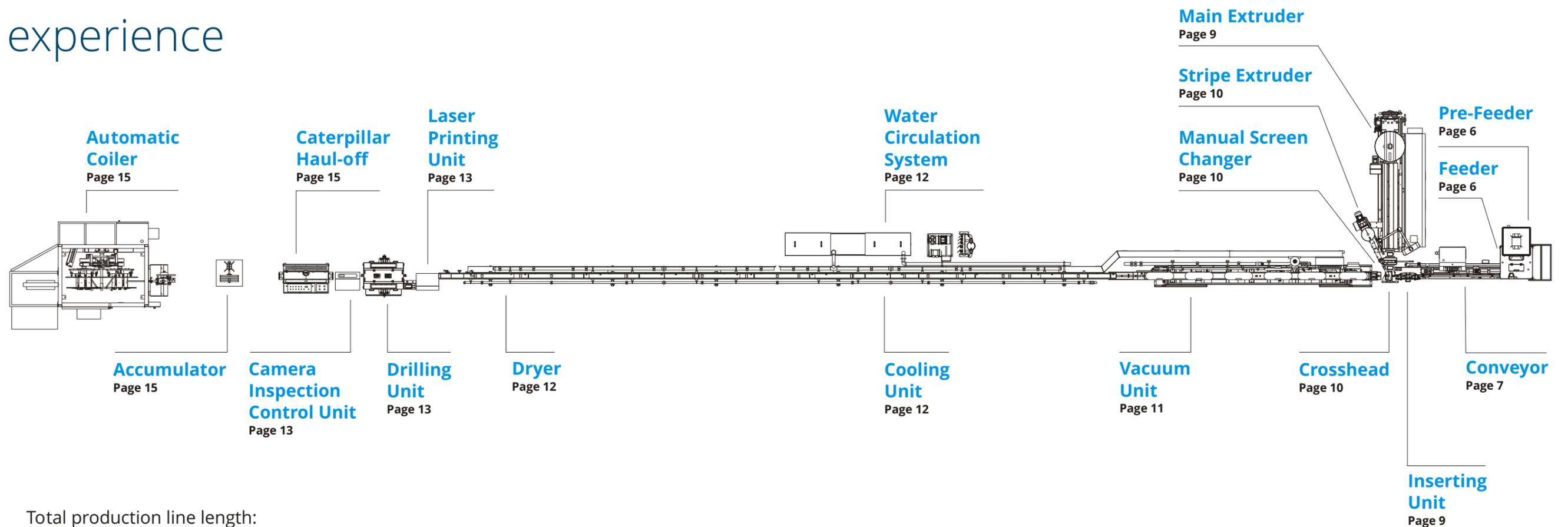
R120 CL

Drip Irrigation
Production Line
For Cylindrical Dripline

R120 CL

production line for cylindrical dripline production, incorporating the latest technology in the industry along with our 40-year experience

Our knowledge, experience and expertise are combined with state-of-the-art technology and offered through R120 CL to our partners. From the design and development stage of every single component which is performed in-house from our R&D department, to the final commissioning of the production line at our partner's premises, we offer a unique quality experience. By bringing together the highest quality material with the latest technologies available, we manage to offer a comprehensive drip irrigation production solution attaining the industry leading production efficiency.



R120 CL

Production Speed	Up to 120 meters/min	Inserting Capacity	Up to 500 emitters/min
Emitter spacing	Minimum 150 mm	Production Efficiency	Up to 99%
Minimum wall thickness	From 24 mil	Maximum wall thickness	Up to 47 mil
Pipe diameter	From 6,35 mm	Emitters*	 

Benefits of R120 CL

The unique attention to every single detail of our production lines along with the quality excellence that we offer, provide many benefits to our partners, which all translate to increased Return On Investment (ROI).

-  Industry leading production efficiency
-  Industry leading production speed
-  Fully customizable
-  The highest return on investment
-  Remote connectivity for software updates and troubleshooting
-  Continuous upgrades in software and hardware
-  Ease of overall usage and settings
-  Human Machine Interface (HMI)

Increased

- Overall production
- Efficiency
- Effectiveness
- Productivity
- Overall capacity
- Quality of the final product

Reduced

- Downtimes
- Malfunctions
- Production shutdowns
- Maintenance costs
- Overall scrap
- Energy consumption
- Water usage
- Vibrations
- Noise
- Factory floor space usage
- Time between product change
- Time for settings and adjustments

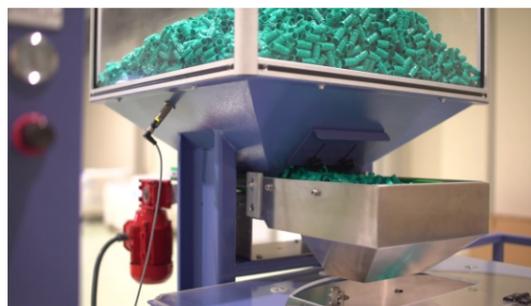
* Triton PC and Turbo Compact equivalent emitters can be used with R120 CL production line. Depending on the size and weight of the emitter, production speed and inserting capacity may vary.

R120 CL Components

All parts of our production lines are designed by our R&D team and produced by carefully selected suppliers according to proprietary mechanical designs.

Emitter Feeder Unit

Cylindrical production lines that operate at high speeds like the R120 CL, need a steady and uninterrupted supply of emitters in order to ensure that there will not be a production shutdown due to lack of emitters. Therefore, the feeder unit is a very important component of the R120 CL production line. In order for our R120 CL production line to operate at the industry leading speed for the particular segment, of 120 meters per minute, there is a need for supplying at least 500 emitters per minute. Feeding this quantity into the inserting unit without interruptions, faults and malfunctions is not an easy task and requires the combination of a pre-feeder and a feeder for an optimum, efficient and effective operation.



Pre-Feeder

The pre-feeder unit ensures the continuous supply of emitters into the feeder by utilizing a fully adjustable conveying mechanism that transfers the emitters to the correct position with the optimum speed. The small adjustment increments attribute to the

optimal operation of the pre-feeder in conjunction with the feeder and make the overall operation of the emitter feeder unit, far more efficient. The vibration mechanism that it incorporates, eliminates the possibility of any damage on the emitters.

The software controlling the operation of the pre-feeder along with the interconnectivity with the feeder, ensures that the optimum number of emitters is always inside the feeder by providing a steady feeding stream.

The main material used for the construction of our pre-feeder is painted steel of the highest quality, selected for uncompromised operation. Moreover, all materials used are of the highest possible quality in terms of durability, performance and compatibility with the rest of the production line in order to ensure seamless operation under all production circumstances and climatic conditions.

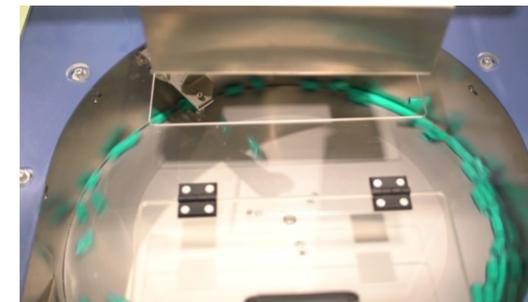


Feeder

The steady and problem free emitter supply of our feeders is a key element of their design. Especially for a production line that

runs at 120 meters per minute (m/min) and requires a total capacity of 500 Triton PC or Turbo Compact emitters per minute (e/min). The high capacity of our feeder, provides the overall desired quantity.

The build quality of the centrifugal feeders is extremely important since they handle an enormous amount of emitters during their lifecycle. Our feeders are manufactured with extremely precise machinery and the highest possible quality materials, selected for the particular operation. The extremely high quality of all parts, ensure a life-time and trouble-free operation.



Our feeders are designed and manufactured by keeping in mind another important aspect related to the production floor, which is the overall space occupancy of the production line. Being able to achieve top performance and durability by keeping the feeder as small as possible is challenging yet achievable with the correct design.

The use of a centrifugal feeding system in combination with extremely low manufacturing tolerances of the parts, results in a non-damaging feeding and insertion process of the emitters.

The overall feeding process is a combination of a specially developed software, along with the mechanical design and characteristics of



the feeder. This combination ensures the perfect balance between the pre-feeder and the inserting unit. The feeder acts as a balance connection point of the overall feeding unit, between the emitter storage which is the pre-feeder and emitter destination, the inserting unit.

Conveyor

Our unique conveyor design enables the perfect transfer of the emitters from the feeder unit to the inserting unit. The operation is performed with the use of an innovative custom-made conveyor belt, designed and developed from our R&D, specifically for the task. The belt is made from a special material which secures the optimum transfer of the emitters towards the inserting, without damaging them in the process due to friction.

The innovative design of the conveyor belt, provides the opportunity to operate without



the use of air as the main transfer force. By not incorporating air, we make sure that no dust or any foreign particles are blown on the emitter surface, or even worse in its labyrinth and water inlet. Moreover, with the use of a conveyor belt, we have completely eliminated the operational noise for the particular module of our production line.

An advanced alarm sensing system is developed, to guarantee high quality end-product under the strictest industry's specifications and seamless operation of the module in the unlikely event of a malfunction during the feeding process.

All critical parts are manufactured under strict tolerances, from a special aluminum alloy to secure no damage on the emitters during the transfer process.

Moreover, a special chemical treatment of all aluminum parts, guarantees a life-time operation without compromising the production speed and performance.



Human-Machine Interface (HMI)

The main idea behind the design of our user interface, is to make it as easy to use and understand as possible, while controlling 100% of the production line functions from all access points. Moreover, training of new production line operators is quick and easy

due to the design of our interface which is straightforward for every operator, regardless of their production knowledge and requires the minimum settings to produce a high-quality dripline.

Hence, the interaction with the machine is user-friendly and the navigation of the parameters is optimized according to the real production needs. The same principle has been followed for the mechanical adjustments of the line. We reinvented, designed and developed every small detail of each component of the production line in order to make it as efficient and effective it can possibly be.

Our HMI is fully customizable and adjustable in order to best fit the production needs and capabilities of our partners. The evaluation metrics of the production line can be set according to user's preference. This allows for a custom fit of the line's operation to each dripline manufacturer, according to their standards.

The HMI provides all necessary data regarding the production line operation, along with a complete set of the production output data. Those functions transform the HMI to a powerful decision-making tool for production planning, cost analyzing, efficiency and effectiveness increasing and so on. Moreover, it is a user-friendly ad hoc monitoring of the production.

Moreover, remote connectivity provides the ability for remote troubleshooting and constant updates for the production line software, directly from our premises to your production line.

Inserting Unit

Switching from Triton PC to Turbo Compact emitter and vice versa, for dripline production is a very simple procedure and the operator can easily perform it without any delays.

The whole inserting system is designed to be able to move back and forth, for a seamless operation and optimization of production, to achieve the highest ratio of productivity versus cost.

Our Smart Control function ensures extreme accuracy for emitter inserting into the drip irrigation pipe that can be achieved by the combination of our advanced software and quality excellence of our production line components. The advanced algorithms we use, achieve the minimum emitter spacing fluctuation of the dripline in the industry.

The flawless operation of our inserting unit ensures that the overall production line operation will not stop for inserting related issues, which will result in decreased

production costs, downtimes and scrap.

Our inserting unit is designed and developed in order to provide a perfect, seamless and problem free emitter insertion for many decades, since there are no other mechanical limitations in its operation.

Extruder

Our extruders feature a special screw design, which was developed for extremely stable material feeding of the head, under all circumstances. The precise and excellent mix of the material is essential for high quality dripline production. Finally, the stress-free push of the material towards the crosshead is vital for forming a perfect inner layer of the pipe, which will accommodate the emitters and will provide a smooth outer surface.

The extruder screw and the barrel are chemically processed for life-time, trouble free operation, in conjunction with the use of virgin raw materials. For the use of recycled raw materials, we offer a different solution of



a bimetal construction of screw and barrel. High quality top of the line gearbox is used, renowned for both the longevity of the equipment and its completely noiseless operation. We use ceramic resistors that provide the best performance ratio of watt consumption vs emitted heat, plus endurance in variable external circumstances.

The advanced PID-controlled heating elements that we incorporate, makes sure that the temperature of all points along the surface of the pipe are the correct ones for the dripline production.

The manual screen changer that we are using, provides a very large filtration surface. Moreover, it has the ability to operate at very high pressures without any leakage. Finally, the change of the filter itself is very easy and doesn't require special tools or knowledge from the operator.

We offer the option for a co-extruder which enables the use of recycled raw materials.

Moreover, with the coextrusion function, the final product can be customized with the use of different color stripes. Those two benefits of the coextrusion allows the manufacturer to offer a very wide product range to the market, and fulfill every customer demand.

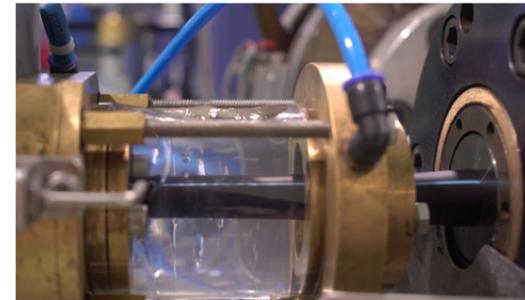
The interface that we have developed is extremely user friendly and utilizes an LCD screen for the easiest possible Human-Machine Interface (HMI) interaction.

The extruder is stabilized with the use of specially designed wheels in order to eliminate any possible vibration at its maximum operation.

The cooling methods that we have selected for the extruder are specially designed and developed to reduce the noise at the minimum possible level, which allows a communicative environment around the production line.

Crosshead

The crosshead carries our own design, in order to be able to cope with the high-speed



production. It incorporates dedicated resistors, specially positioned to achieve uniform temperature distribution and optimal heat transfer.

In order to consistently produce a high-quality thick wall dripline, a very low pressure of the material is essential. This is the reason why we have designed a unique crosshead capable of combining all desired elements.

Our crosshead is designed for extreme effectiveness and efficiency, making the tools changing process, extremely easy and less time consuming. We have managed to reduce any pipe rotation tendency, by developing a completely new and innovative system which ensures the symmetrical distribution of pressure on the head outlet. We want all parts of the crosshead to attain the quality excellence that we praise, therefore we have developed a special chemical process for hardening each individual part.



Vacuum Unit

The process of shaping the pipe, by adjusting the vacuum through advanced Proportional Integral and Derivative (PID) algorithms enable us to achieve an absolutely stable vacuum under pressure and water leveling.

We provide exceptional built quality, with the most critical parts of the vacuum unit manufactured from high quality stainless steel. We want to ensure that no rust will be created on the surfaces of the individual parts and that the whole unit will be robust and steady under operation for many years of continuous operation.



We have developed an innovative method for hole detection on the dripline, which utilizes both specially designed hardware and software. The intelligent algorithms used are a result of extensive research on probabilistic models.

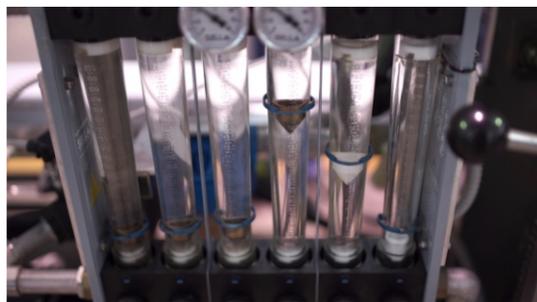
Finally, the vacuum unit is designed in such a way that when the pipe is cut, there is no water going out of the system.

Water Circulation System

We have developed a closed loop water circulation system for every production line. The main advantage of this system is that each line is independent from the rest of the factory. This means that our production line

is not affected in any way from the operation of other lines, or machinery in the factory. Moreover, since there is no need for a drainage system, the production floor is always clean and most importantly free of water transfer pipes.

The quality excellence that we praise is present in the closed loop system as well, with all parts manufactured from high quality stainless steel. By using the specific material, we make sure that no rust will be created on any surface and that the build quality is exceptional and consistent.



Cooling Unit

With our dedicated cooling unit, we achieve a uniform distribution of water with the ideal temperature, along the complete length of the cooling through. By incorporating many water inlets and outlets on critical positions, we achieve an ideal for the task, high circulation rate. This provides an additional advantage, since it results a reduced need of overall cooling length, saving cost and valuable space on the production floor. Just like the other parts of vacuum and cooling module, all important parts of the cooling unit are manufactured from stainless

steel, to ensure a rust free and long-lasting operation.

The unit carries a fully adjustable mechanism, in order to achieve the perfect alignment, in the minimum possible time, without any water leakage.



Dryer

The design of our dryer which is a result of extensive research and experience, along with the ingenious usage of physics, ensures that the dripline is dried perfectly.

The innovative design of the air nozzles that we have developed, provide the ability to make the perfect adjustments of both the air speed and direction. This enables the perfect drying of the dripline in a very short time.

The complete drying system is a closed type one, which means that the production noise is the minimum possible.

Laser Printing Unit

Our R&D design and development team managed to incorporate, for the first time in an ultra high speed drip irrigation production line, a laser printing unit. This purpose built unit enables ultrafast marking of traceability and marketing information on the driplines. The flexibility and precision of the marking allows the manufacturers to mark clear and unique information of unparalleled quality. As all our production line units, it is produced with the highest quality materials to ensure excellent and long lasting printing quality.



Drilling Unit

The drilling process of the dripline is one of the most complicated and yet important



functions of a drip irrigation production line. This is why we have put a lot of effort in designing and developing the most advanced drilling unit in the industry. Capable of coping with the drilling demand of a high-speed production, of 120 meters per minute. The operating capacity of our driller is up to 500 emitters per minute, making it the fastest drilling unit in this segment of the industry.

The dripline positioning is constantly adjusted automatically, in order to maintain the perfect position of the emitter under the driller and therefore perform a perfect drill every time, at the highest operation speed.

We have developed an innovative and revolutionary inspection system, which utilizes a multi-point camera setup and



intelligent algorithms, for the drilling inspection of cylindrical driplines, which requires the minimum adjustment.

The unique advanced motion control algorithms that we have developed, enables us to almost eliminate the vibrations derived from drilling.

We have developed two or four hole drilling for the water outlet. The drilling operation is performed by utilizing advanced algorithms and a software, specifically developed for the task which can evaluate two or four holes respectively.

The advanced and innovative design of every single part of the drilling unit, along with their exceptional quality, ensures that there are not any sensitive parts in the system that can be damaged from the drilling process.

The build quality of the drilling unit is extremely important since it is a module that operates at high speed throughout its lifecycle, performing countless drills. This is the reason why it is manufactured with extremely high precision machinery and



materials of the highest quality, carefully selected for the particular operation. Moreover, the high quality of all aluminum parts, ensure a life-time and trouble-free operation. Finally, all critical parts are constructed from a special aluminum alloy to achieve an extremely low weight.

We have designed and developed a unique air vacuum system, which can be used either for two or four holes depending on the dimensions of the emitter, that removes and stores the part of the pipe that has been cut during the drilling process. This leads to a totally clean space around the drilling unit, without any cutting chips.



Haul-Off

Caterpillar R120

The unique design of our caterpillar unit in conjunction with the software development and the controlled algorithms that we use, enable us to achieve a perfect and stable pulling of the dripline.



The great built quality of our caterpillar ensures its durability and the high performance of the unit. It is equipped with poly-V belts which guarantees a perfectly aligned movement of the belt and dripline. By designing it from scratch and carefully selecting special materials for our caterpillar, we have managed to develop a noiseless

haul off unit with no vibrations for the pull of a wide variety of driplines.

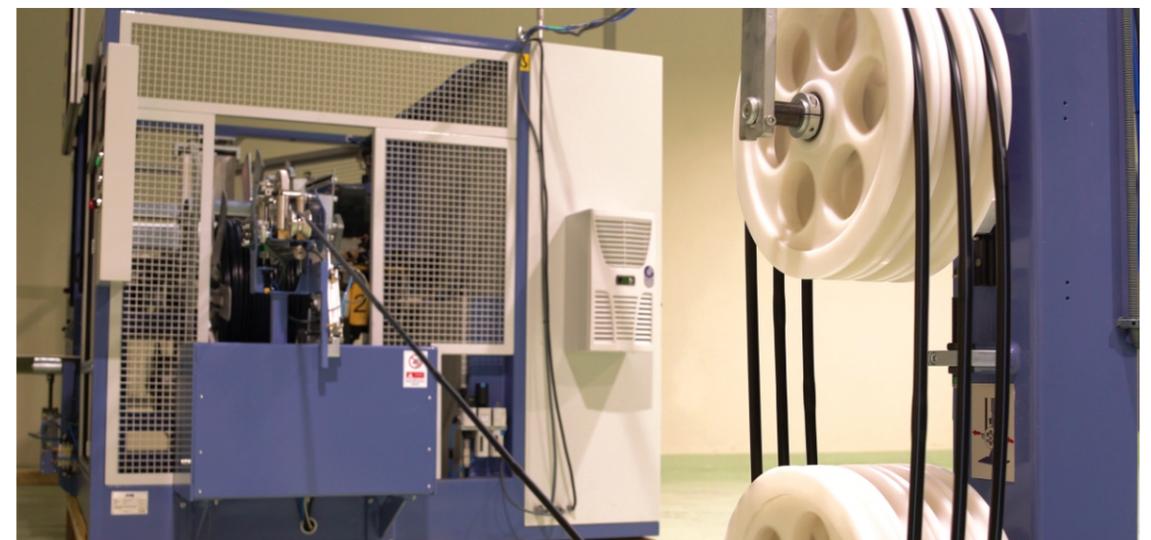
Automatic Coiler

R120 Flat Dripline Coiler

Our flat coiler is fully automatic and able to cope with the high-speed production of more than 120 meters per minute.

The special design of our coiler provides the ability to produce a wide range of products with a total coil width from 120 mm and up to 300 mm. The operation of the coiler has been designed in order to achieve a perfect coil change, at speeds up to 120 meters per minute. In order to provide to our partners the best possible performance of the coiler and guarantees a seamless automatic coil change at 120m/min, an accumulator is developed for the task, which plays a significant role and enables us to achieve the desired results.

Our coiler's unique design and automation software, provides the ability to the line operator, to perfectly adjust the tension of the dripline during the coiling process, in both the steady and transient states.



Customization

The knowledge, experience and expertise of our dedicated production line development team, enables us to provide customized solutions for the specific bespoke needs of every market worldwide. Our 40-year experience in the drip irrigation industry, equips us with the ability to understand every dripline producer needs, goals and expectations. Moreover, we already know that the market each company operates in has its own challenges and we have solutions for each challenge.

In order to meet all drip irrigation production criteria and constraints of our partners, and at the same time deliver a perfectly operating production line with a great efficiency, we have developed a wide range of different

solutions for each production line component. All components provided are designed, developed and optimized by our R&D team and can be combined in order to reach the best possible outcome with the greatest production output and achieve the highest possible Return On Investment (ROI). The production line department will work with you hand in hand to develop the optimum dripline production solution for your individual needs. We can provide several alternatives that will enable you to achieve all your targets. We will thoroughly explain the benefits of each solution, in order to assist you with the optimal dripline production configuration.

Holistic Approach in Human Error Elimination

One of the critical elements in a production procedure is the human error. In an attempt to eliminate this issue, we have developed a holistic approach which involves three basic steps and minimizes the need for human intervention.

The first step is the development of an HMI which is extremely easy to operate and does not require any particular knowledge or skills. From the simple to understand graphics and the ease of access through the touch screens, our interface can be operated as easy as any tablet or smartphone.

The second one, is the advanced software that we have developed which provides the

ability to preprogram and set several production criteria that can be easily accessed and selected by the line operator. Moreover, the micro adjustments that might be needed are extremely easy and can be performed via the touch screens either on the beginning or the end of the line.

Last step but the most important one, is the extensive training that we provide to your production line supervisor. Our 40-year experience enables us to provide the highest possible training in both production line operation and immediate problem solving during production.

Commissioning

We have developed a unique production line commissioning experience for our partners. As soon as you place your order, we start working on it by assembling all components of your production line. The next step is to start operating the production line and run several tests on every component, in order to ensure that it is operating as described. As soon as every test is completed and we produce an adequate quantity of high-quality dripline, we welcome you in our showroom for a comprehensive demonstration. You are able to see your production line operate for the first time and experience firsthand the quality excellence of our products and services.

After your approval, the production line is carefully packed and shipped to your factory.

Upon arrival of the production line, our dedicated commissioning officer will come to your premises to finalize the commissioning process which involves several steps. First of all, he inspects the production line components. The next step is to install them in place and make the appropriate alignments and adjustments. The final step involves both initializing the production line operation and at the same time train your line supervisor.

As soon as the production line runs smoothly, the dripline is produced according to specifications and your production team feels comfortable with the complete line operation, our commissioning officer can leave the premises and the commissioning is regarded complete.



Support

Products

We have designed and developed a wide range of emitters which can meet all irrigation needs worldwide. The enormous production capacity that we have in emitters guarantees a constant supply of the most important ingredient of a dripline.

Raw Materials

We can assist you in raw material selection for your dripline production at every level. Depending on availability at your specific area, we will determine the optimal solution which will best suit your production needs.

Spare Parts

We keep a wide range of spare parts and consumables at our warehouse in order to be

able to dispatch them immediately to your premises and therefore reduce the downtimes to the minimum possible.

Troubleshooting

In the unlikely event of a production shutdown due to a production line malfunction, the line operator has to follow the standard procedure which was thoroughly explained to him during the initial training process. If the problem persists and cannot be solved by following the standard procedure, we provide the ability to connect remotely with our premises and provide a solution online. Moreover, our technicians are always available for any issue that can not be solved by your maintenance team, offering immediate On-site support.

Constant Upgrades and Enhancements

In order to achieve the quality excellence that we praise, we never stop evolving. The extremely fast pace of technology evolution, combined with the advanced skills and experience of our team members, enables us to constantly improve our production lines. By utilizing the latest available technology, we constantly upgrade both the hardware and the software of our production lines in order to offer to you the best possible solution.

Hardware

The hardware upgrades that we design and develop, are compatible with both our current and previous model range. This means that we offer the opportunity for an older production line to be more productive and efficient. Another advantage of constantly improving several parts, is that of increased durability and reduction of the maintenance costs. Finally, we develop new product kits and sets that can be installed on the production lines to increase profitability and make an impact to your market by differentiating. For instance, the introduction of a flap outlet instead of a hole that can be easily installed and interchanged. The coextrusion kit that enables the production of dripline with one- or two-color lines.

Software

The software upgrades that we develop are designed for both functionality and convenience. The functional updates are designed to enhance the operation of several different parts and to allow for a more productive and at the same time cost effective overall operation. Moreover, every new hardware update needs its corresponding software update to function. The convenience updates have to do with the HMI ease of access and usability for error proof operation and the remote connectivity or the interconnectivity between the production lines.





Showroom:

10 Andrea Araouzou str.,
3056 Limassol, Cyprus

Head Office:

12 Andrea Araouzou str.,
3056 Limassol, Cyprus

Factory:

9 Fytion str.,
3056 Limassol, Cyprus

T: + 357 25 399962

F: +357 25 399963

aas@aasystems.eu