



Solutions for Blow Moulding

Improve your efficiency



WELCOME

Delta Engineering offers you:
Focus on far-reaching efficiency
Ample attention to safety
Extensive partnership and service
... and more

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LETTER FROM OUR COMPANY DIRECTORS



Dear customers, suppliers and business partners,

At Delta engineering, we have over 30 years of experience in solutions for blow moulding. Since our founding in 1992, we have been focusing on the needs of our customers and more specifically on developing a comprehensive range of solutions to the problems that companies in the sector currently experience.

Today, Delta Engineering occupies a leading position in the sector. Our success is based on a wide range of well-thought-out blow moulding solutions. It can also be explained by our competent personnel, their loyalty and therefore the accumulation of experience, which hugely benefits our customers. Another factor is innovation. Our innovations illustrate the high standards we set for ourselves as a market and innovation leader in the blow moulding downstream industry. And, last but not least, we thank our growth to a constant drive to improve our service even further.

We are very proud that our products yield a high level of satisfaction from our customers. We owe this success to our customers and employees. Our sincere thanks for more than a quarter century of loyalty.

Danny De Bruyn
Managing Director

Rudy Lemeire
Managing Director

ABOUT US

OUR COMPANY



DELTA ENGINEERING

We have become one of the leading suppliers of automation solutions for the blow moulding industry. Our product line is the most comprehensive in the market: encompassing take-out systems, quality control equipment and packing & finishing solutions for the production of plastic bottles and containers.

THE BENCHMARK FOR BLOW MOULDING

Delta Engineering is an engineering company: we not only design machines for highly specialised corporations, but we also build them, thus offering our customers more efficient, less costly production with thorough quality control.

Our strength?
Nobody understands blow moulding automation better than we do!



OUR MISSION: “WE IMPROVE YOUR EFFICIENCY”

Our mission is to develop the solutions that enable our customers to stand out from the crowd. When designing new machines and solutions, our KPIs are our customers’ process, labour, packaging material and transport costs.



OUR VISION: “YOU DICTATE OUR QUALITY”

How do we develop our product range? Through cooperating closely with you, our customer: your critical feedback enables us to fine-tune and enhance our products. The crucial factor to our success: the people in our enterprise and their creative potential. Our goal is to achieve customer satisfaction through excellence in designing high-quality, cost-effective solutions, manufacturing, installation and after-sales support. Through the drive and expertise of each individual employee, we are uniquely positioned to meet the demands of our customers around the world.

ABOUT US

AREAS OF EXPERTISE



CREATIVE PROJECTS

Our team of qualified employees can assist you in the design, redesign or integration of new lines in your factory. By taking into account all constraints and using the latest technologies, we can help you turn your production site into an efficient entity.



CUSTOMISATION

You can't find a suitable machine in our product range? No problem! Our team of qualified employees will adapt an existing machine or create a completely new production or packaging line.



BEST SERVICE

We have several teams of qualified specialists ready to help you. With today's increasing complexity of machines & lines, this has become a necessity. Our service teams speak different languages to support you in your local language. Thanks to our different sites across the globe, we can support you nearly around the clock. Moreover, we have large quantities of spare parts in stock at each site.



KEY TO SUCCESS

- +30 Years of experience
- Customer intimacy
- Loyal staff
- Innovation
- Creativity
- Long-term relations
- Teamwork
- Flexibility
- Reliability
- Respect



SAVINGS

At Delta Engineering we focus on our 4 pillars:

- labour cost
- transport cost
- packaging cost
- product cost



FACTORY AUDIT

Our experience and a range of self-developed tools allow us to do an independent audit in your factory. We detect ways to save on packaging material, energy, labour and investments.

We know our customers are looking for strong cooperation and flexible solutions.

That is why we deliver a complete concept: design, construction and integration in your production line, we do it ourselves.



ABOUT US

OUR MILESTONES

1990



1992 COMPANY START-UP/BE

Danny De Bruyn and Rudy Lemeire, engineers with 10 years of experience in the blow moulding sector, develop an innovative single head leak tester, in a garage.

This innovation led to the start-up of Delta Engineering.

1995

1999 MOVE TO AALST/BE

Move to production facilities and offices in Aalst.

2000



2002 MOVE TO OPHASSELT/BE

Due to significant growth, Delta Engineering moves to Ophassel, where it finds more space.

2005

For around a quarter of a century, Delta Engineering has been synonymous with high-quality blow moulding solutions. The company was founded in 1992 to market a new single head leak tester and has since become a European market leader with an exceptionally wide range of in-house produced solutions. Today, Delta Engineering employs over 180 people. Delta Engineering's products are exported to more than 50 countries around the globe, including remote sales regions such as Argentina, South Africa and North America.

2010



2011
NEW FACTORY IN BAIJA MARE/RO
New factory in Baia Mare, Romania.

2012
START-UP IN ATLANTA/US
Opening of our branch in Atlanta, USA.

2013
EXTENSION FACTORY IN ROMANIA/RO
Move to our larger factory in Merisor, Romania.

2015



2016
NEW FACTORY IN DULUTH/US
Move to new office in Duluth, USA.

2017
NEW FACTORY IN MERISOR/RO
Launch of our third unit in Merisor, Romania

2020



2019
OUR COMPANY TODAY/BE-RO-US
New R&D center in Belgium.
Extending production capacity in RO
5000m² manufacturing site.

FUTURE

OUR SERVICES

FACTORY OPTIMISATION & LINE SIMULATION

FACTORY OPTIMISATION

Our team of qualified employees assist you while integrating new lines into your factory. We help you establish the most effective and efficient production lay-out, shorten your processes, optimise the flow on the floor and avoid an excess of operators. We automate your lines and make your machines fit seamlessly with the new automation solutions, including AGVs.

LINE SIMULATION

With our line simulation software, we test the virtual version of your blow moulding line, in parallel with designing it. This approach has many advantages. It helps us make high-quality high-speed product lines, able to handle complex bottle geometries. It also limits the need for on-site testing. Furthermore, it contributes to making the right choices.

For example, it helps choose the right buffer capacity by simulating its consequences beforehand: this minimises production time and maximises the efficiency of your lines.



**Delta Engineering
can help you to enhance
the efficiency of your
production line!**

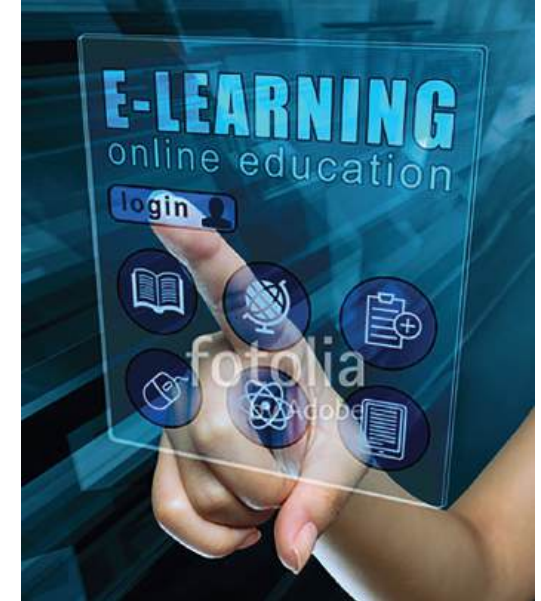
OUR SERVICES

TOOLS & E-LEARNING

TOOLS

Thanks to our easy-to-use online tools, making the right decisions has never been easier in fields such as packaging, leak testing, labour and finance.

- **Packaging**
Which packaging pattern gets the maximum number of bottles on a tray? With our online packaging tools, you get to know that in the blink of an eye. Same thing for comparing costs using bags or cardboard. Other cool features are on their way.
- **Leak testing**
We have been working on leak testing since the very start of our company. Our online leak testing tool contributes to our extraordinary proficiency in that field. That tool makes it easy to calculate the precision of leak testing for each specific run. Also, we have a dedicated high-voltage leak tester, which includes the possibility to calculate how many bottles per hour can be tested.
- **Labour**
Wouldn't it be handy to have a calculator to determine the workload for each of your machines? With our online labour tool, we created just that. Thanks to that calculator, you know that you need, for example, 12 percent of an operator to get a specific job done with a certain machine, but 5 percent to get the same job done with another machine. Or maybe it makes you change the parameters of the work to be done, because it implies less labour cost. Plenty of possibilities are ahead with this amazing tool.
- **Finance**
Good financial management is the basis of everything. Our tool contributes to that, taking into account parameters such as payback and interests.



E-LEARNING

We go further than selling machines: we pay a lot of attention to providing support. This includes free training with our online e-learning platform. It improves the skills of your operators/engineers and includes an online exam. Training certificates are handed out automatically upon finalising the course.

Training is key today, as....

- Machines are more complex.
- Availability of well-trained staff is a problem.
- Availability of parts diminishes. Due to the booming economy, some parts have increasingly long lead times. Hence, you can afford even fewer ruptures than in the past; training helps avoid them.
- Having the right skills on-site is very important for OEE (Overall Equipment Effectiveness).

We offer different courses. These courses are not limited to our machines. Technology courses (Extrusion Blow Moulding, Injection...) are included as well.

QUALITY CONTROL

LEAK TESTING

A GREAT INVESTMENT

Thanks to standardisation, improved production techniques and state-of-the-art technology, we can provide you with a high-quality leak tester for an unbeatable price. Our leak testers' good return on investment is also thanks to their few false rejects. Imagine the cost of a bottle is € 0,11, on a machine running at 1100 BPH, 7800 hours per year. In that case, every percent of product loss (such as false rejects) costs € 10 000 per year... A multiple of the capital investment for the unit over the fiscal period.

EXCEPTIONAL FEATURES

Our leak testers come with special features that make them stand out from the crowd.

- **Positive ejection**
Most of the machines on the market eject a bottle when the system says the bottle has a leak: 'negative ejection'. However, it is much better to act when a product is good: 'positive ejection'. Using this approach, you can reduce your customer complaints to nearly zero. It ensures that all bottles are considered bad whenever a mistake or failure appears, e.g. lack of compressed air, valve or photocell failure, etc.
- **Preblow**
Our preblow technology makes leak testing more precise and stable.
- **Our algorithms have proven their value and robustness throughout the years.**
They make your production more stable by eliminating process variation!
- **Less 'operator-dependent'**
KISS: keep it simple for the operators.
- **Detect process variations**
We have found an easy way of detecting product variation, making the information available to the operator. That way, the operator is informed that something in the process changed, so he or she won't play around with parameters.
- **Ejection detection guarantees that a bottle is ejected**
- **Rigid construction thanks to our stable frame**
- **Statistical analysis**
Leak testing is a very interesting source of data. Basically, we can monitor and detect process behaviour and changes, and react to it.

QUALITY CONTROL LEAK TESTING

KNOWLEDGE TRANSFER

Furthermore, we offer services for audits and perform knowledge transfer from our enterprise to yours.

- We provide training to your operators. Our online learning platform keeps their knowledge at a high level for a long time. It also allows you to train new staff.
- We organise audits on existing lines to evaluate leak test setup.

THE BEST ACCESSORIES

Thanks to our decades of experience, we make the right choices when building leak testers.

- We know it's best to choose reflector-based photo-electric switches which are colour-independent, and also very stable when the product colours and transparency vary.
- We use chain conveyors with vacuum connection (flat belt conveyors tend to get a bit worn out in the middle after a certain period).
- Our testing systems are designed to have exact timings and are therefore interrupt-driven.
- We provide a lot of CPU power. This is beneficial for pressure decay measurement as it is very time-critical.



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QUALITY CONTROL

LEAK TESTING

OUR PRODUCTS

Discover our different leak testers: built-in, static, on the fly, high voltage and rotary. Speeds can go up to 500 bpm, depending on bottle volume and leak specifications. Also discover our calibration system.

- **Built-in**
Our built-in leak testers are designed to be integrated into an existing machine. They test a wide range of products, are very user-friendly and provide a clear overview of test results.
- **Static**
Our static leak testers stop a bottle to test it for a leak and then let it go again – if it was a good one. They test a wide range of products, are very user-friendly and provide a clear overview of test results.
- **On the fly**
Our ‘on the fly’ leak testers test a bottle for a leak while it passes. The bottle doesn’t stop for the test, so there is no accumulation. All of our on-the-fly leak testers are provided with adaptive flyback to optimise accuracy and line speed. This feature optimises automatic leak testing.
- **High voltage leak testing**
Micro cracks in the bottom of PET bottles lead to many recalls. They are easy to avoid thanks to our high-voltage leak tester. It checks with extreme accuracy for leaks caused by micro cracks in the bottom of PET bottles.
- **Rotary**
Our high-end rotary leak tester can handle speeds of up to 40 000 BPH. It is a modular device, configured with test heads. It ensures a trouble-free operation with minimal false rejects.
- **Calibration systems**
Good leak testing needs good calibration systems, either automatic or manual. Add them to your leak tester. They include a calibrated leak, which is opened when the bottle test starts. For good results, use them on online, ‘warm’ bottles. After the test, the bottle should be rejected.





QUALITY CONTROL

QUALITY CENTER, OPTICAL INSPECTION & METAL DETECTION

QUALITY CENTER

Our quality centers provide an inline, overall inspection of containers and barrels. This includes, for example, leaks, handles, bore holes, and weight. An optional weight checker gives feedback to the extruder, contributing to saving on raw materials.

OPTICAL INSPECTION

Our vision systems allow you to check bottle dimensions, black spots, ovality, scrap, bottle deformation, colours, etc. Our compact type is designed to place over an existing conveyor, our advanced type is designed to integrate into production lines. Up to 8 cameras with each up to 12 MB are possible. Optical inspection systems require a lot of knowhow, which we proudly possess. We know from experience that they have huge potential. We are aware of their possibilities as well as their limitations. Our staff can tell you if they are the right solution for you.

METAL DETECTION

Our in-line metal detector includes a special non-metal chain conveyor, to allow the products to run through. Its polished stainless steel housing (AISI 304) meets the highest hygiene demands.



QUALITY CONTROL X-RAY INSPECTION

WHAT ARE CT-SCANNERS?

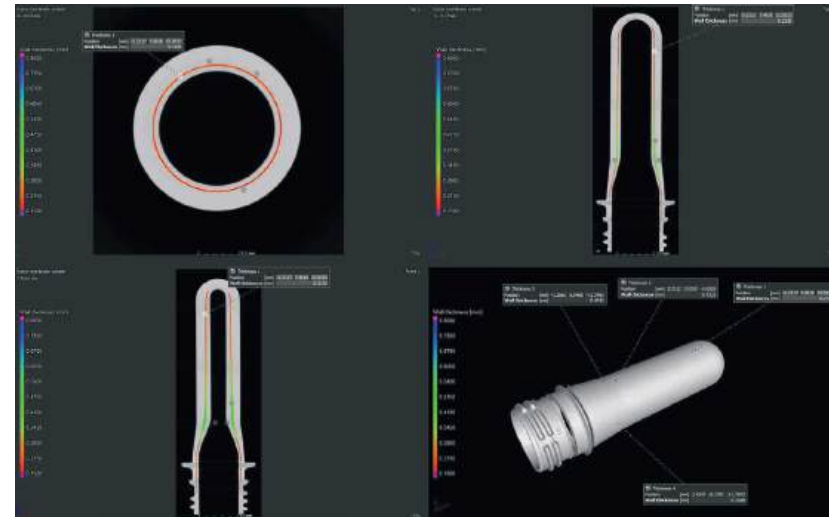
A CT scanner (computed tomography scanner) uses X-rays to beam through an object onto a receptor plate. By doing so, it generates a cross-sectional image. It generates multiple images while the object is turning around and processes them into a 3D model. This allows you to see inside the object, without cutting.

This spearhead technology is well-known in the medical sector. We made it available for quality labs in the blow moulding industry. Our CT scanner visualises the complete bottle with extreme precision. This allows you to do a fully automated quality inspection, measuring thickness, inclusions, presence of layers, etc.

ADVANTAGES OF CT SCANS

Thanks to CT:

- Many extremely precise data can be displayed, such as wall thickness and thickness of layers (inner layer, outer layer, barrier...).
- Based on the data, parameters are calculated: volume, top load, burst pressure, CO₂-/O₂-/H₂O-barrier simulation ...
- Even the smallest, most hidden flaws appear on the images: inclusions, false air channels, irregularities...
- Product analysis and quality control become easier.



DURING DESIGN AND PRODUCTION

This solution proves handy during:

Design






Thanks to the impressive computing power of our CT system, even in the design phase, it can calculate what would be the volume, burst pressure, barrier properties, etc. It calculates if specs are still being met with less material, which enables you to achieve tremendous savings. This information is presented in a user-friendly way, for example with sketches of bottles indicating wall thickness in different colour codes. The perfect tool for reducing weight during the design phase!

Production

Quality control of bottles, containers and preforms is often quite labour-intensive: personnel cutting and measuring dozens of bottles, for example. CT scanning, however, is a largely automated solution which quickly measures characteristics and detects even the smallest flaws. It yields high-quality process feedback and produces many (big) data. This allows you to fully automate your quality lab.


PACKAGING MARKET SELECTION GUIDE

The following schedule and listing gives an overview of different packaging needs, the solutions we advise for them and which of our packaging machines can be used.

	ARRANGED					TUMBLE					
	Bag on pallet	Bag in pallet box	Trays up	Trays down	Trays neck down	Flat sheets	Cardboard box	Stackable	Cardboard box	Pallet box	Flexible silo
 Medical	!	✓	✗	✗	✗	✗	!	!	!	!	✗
 Food	✓	✓	!	!	!	!	✓	!	!	!	✗
 Cosmetic	✓	✓	!	!	!	!	✓	!	!	!	✓
 Household	✓	✓	✓	✓	✓	✓	✓	!	!	✓	✓
 Chemical	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗

- ✓ OK
- ! OK, but not advisable
- ✗ Not OK


PACKAGING MACHINE SELECTION GUIDE



Small-size bags
DB100 fully-automatic bagger
WEL100 shrinking tunnel

Half-size bags
DB112 fully-automatic bagger
WEL110 shrinking tunnel


Full-size bags
DB050 semi-automatic bagger
DB122 fully-automatic bagger
DB222 twin infeed fully-automatic bagger
WEL110 shrinking tunnel
DB142 fully-automatic bagger (high products)
WEL115 shrinking tunnel (high products)
DP4X0 bag stacking



Small-size bags
DB100 fully-automatic bagger
WEL100 shrinking tunnel


Half-size bags
DB112 fully-automatic bagger
WEL110 shrinking tunnel

Full-size bags
DB050 semi-automatic bagger
DB122 fully-automatic bagger
DB222 twin infeed fully-automatic bagger
WEL110 shrinking tunnel
DB142 fully-automatic bagger (high products)
WEL115 shrinking tunnel
DPB100 pallet box




Small boxes
DCP050 manual case packer
DCP100 automatic tray & case packer

Large boxes
DCP200 automatic tray & case packer




Half-height pallet
DP20X semi-automatic palletizer


Full-height pallet
DP290 compact fully-automatic palletizer
DP300 fully-automatic palletizer
DP4X0 flexible palletizer & depalletizer




VZT11X collation table
VZT2XX tray packer
VZT400 flexible robot (preformed trays)
VZT500 high-speed tray packer
DP20X semi-automatic palletizer
DP240 fully-automatic palletizer
DP4X0 flexible palletizer & depalletizer
DCP100 tray & case packer
DCP200 tray & case packer




VZT11X collation table
DP20X semi-automatic palletizer
DP4X0 flexible palletizer & depalletizer




VZT23X tray packer
VZT24X tray packer - short version




VZT11X collation table
DP20X semi-automatic palletizer
DP4X0 flexible palletizer & depalletizer
DP55X high-speed fully-automatic palletizer



DSB200 box filler



DSB200 box filler
DSB250 tumble pack unit
DSB300 tumble pack unit
DPB100 pallet box



DSB250 tumble pack unit
DSB300 tumble pack unit
DFSXXX flexible silos
DSS010 silo loading unit
DSS050 silo unloading unit
DBP10X bottle picker

PACKAGING BAGGING

Packing empty bottles in plastic bags is a hygienic packaging solution. It is also suitable for demanding circumstances, such as in the medical and food sectors. Furthermore, it is the most economical way of packaging. Therefore, it is no surprise that the last years we have seen a move on the market towards bagging, replacing the more expensive cardboard trays.

KEY CHARACTERISTICS OF OUR BAGGING MACHINES



Safety

Safety is key. All of our bagging machines are compliant with the latest safety standards.



User-friendliness

We pay special attention for our machines to be user-friendly. We accomplish this by reducing the parameters to be set up by the operators as much as possible. We succeed in doing that, among others thanks to implementing the cleverest algorithms.



Adjustability

Short changeover times thanks to recipes.



Saving space

We can convey the readymade bags at high speed over the bagging machines, saving space in the packaging area.



Quality

Our bagging machines have a very good price-quality ratio thanks to a good machine concept, minimal assembly times and the use of high-quality components for automation and pneumatics.



Flexibility

Depending on the model, our bagging machines can handle various product types, from 10 ml pharmaceutical bottles up to 30 l industrial containers. Furthermore, multiple infeeds ensure high production speeds.



Modularity

To automate your complete production line, Delta Engineering can deliver optional downstream bag handling automation.



Stability

The machine consists of 1 base frame. Its solid construction results in low maintenance costs for many years.



PACKAGING BAGGING

PAYBACK TIME

Depending on the product type and the production speed, the payback of a bagger is typically 6 to 18 months. This short payback time is thanks to the cost reduction in material, labour and transport:

- **Low packaging cost**

The cost of plastic foil is, on average, between €/€ 0,12 and €/€ 0,15 per bag, a huge difference in comparison to the tray, which costs up to €/€ 0,55 per layer. The difference with boxes is even bigger, €/€ 0,75/box. Furthermore, our baggers are equipped with the newly developed welding beams Easyweld™, resulting in relatively tight bags without the need to shrink them. These welding beams also allow you to use very thin foil which results in an extra saving on raw materials! Also, we can deliver plastic film from 25 up to 50 µm ourselves at quite competitive prices.

- **Labour**

The fully automatic baggers barely require any labour anymore, and no tray handling. They never require more than half of the labour needed with trays, and often a lot less.

- **Transport costs**

By optimising the number of products per pallet, transport costs are minimised.



PACKAGING BAGGING

DIFFERENT WAYS TOT BAG

■ Semi-automatic bagger

The operator slides preformed bags into the machine over an arm and the bottles are pushed into it. Then the bag gets sealed, either automatically or manually. Then the operator slides the next bag over the arm. With this type of bagger, you need a different, customised bag for every bottle. Also, if the customer wants a different pallet, you need a different bag. Hence, it comes with some logistical challenges. Furthermore, it is less user-friendly, which could imply more downtime, depending on the operator. On the other hand, a semi-automated bagger is cheaper than a fully automatic bagger or a tube-style bagger.

■ Tube-style bagger

A tube-style bagger is an automatic type of bagger. With this kind, you start from a roll of foil: tubular foil. Such a bagger implies less downtime than a semi-automatic bagger. But it still has the disadvantage that a different bottle or pallet needs a different type of bag; in this case: a tubular foil of a different width. Another drawback is that with tube-style baggers, it is necessary to use multilayer film: foil that is stiff on the outside and smooth on the inside. If the inside isn't smooth enough, the bottles will fall over in the bag. Tube-style baggers are typically used in the milk industry. We chose not to sell tube-style baggers.

■ Fully automatic bagger

The fully automatic bagger (twin sheet type bagger) simply uses two widely available standard rolls of film. This bagger welds two types of foil together around your bottles. Is the foil a bit wider than you need for a certain batch of bottles, then you have some more foil waste coming from the edges. Hence, this bagger is very flexible, and it makes logistics easier (bear in mind that when you order foil, you always have to order a minimum quantity of 5 tons). Also, fully automatic baggers have fast changeover times. It is a very hygienic way of packaging.



PACKAGING BAGGING

OPTIMISATION SERVICE

Our bagging machines are among the best on the market. If you also know what is the best way to use them, you will have a big head start on your competitors. That is where our specialised staff and their support comes in. We even have a dedicated packaging trial center.

Thanks to our decades of experience in packaging machines, we are ideally suited to advise you about the best way to bag: get the maximum number of products in each bag, in the shortest possible time, at the lowest cost. Simply send us some of your bottles.

We designed special welding bars to allow you to create fairly stable bags without shrinking. Our staff can tell you to what extent it could be advantageous to shrink the bags anyway. They also know what to do to obtain the pallet with the highest possible stability. Besides, they can tell you how to make the pallets as easy to handle as possible.

PLASTIC FILM SERVICE

We can supply you with very competitively priced film, based on the ICIS index. This film is important to get a stable bag and pallet.



PACKAGING

SHRINKING TUNNELS

Our baggers can be equipped with shrinking tunnels, which provide even better stability and manipulation of the bags. There are two types of shrinking tunnels. Thanks to good insulation, their energy loss is limited.

HOT AIR GUN TUNNELS

Hot air guns blow air of 400 to 600 degrees into the tunnel and shrink locally. For some specific types of bottles, they can be a good solution. We can build them into our machines as an option.

HEATED TUNNELS

Heated tunnels never reach extremely high temperatures. Typically, they reach up to 150 degrees. The whole bag is moved through the tunnel slowly, and you get an even shrinkage everywhere. We sell them as stand-alone machines, for in-line shrinking after a bagging machine.



PACKAGING

TRAY PACKING

OUR PRODUCTS

We provide plenty of choice in tray packing machines.

- **Collecting table**
This type of tray packer provides a collation table, to enable the operator to pack bottles manually, and a buffer table.
- **Short buffer tray packer**
This type of tray packer provides a collation table to pack bottles and a buffer table. The operator puts the tray on the machine, and the machine inserts the bottles.
- **Inverted style tray packer**
This type of tray packer provides a collation table to pack bottles neck-down and a buffer table. The operator puts the tray on the machine, and the machine inserts the bottles.
- **Collecting table**
This machine is used to prepare a layer of products. To be used in combination with a flexible palletising unit. Consists of a buffer table and buffer conveyor.
- **Flexible robot packaging unit**
This type of tray packer includes a flexible robot packaging unit and a buffer between the blow moulder and the filling line. It is particularly suitable for high-end non-accumulable bottles that are difficult to handle.

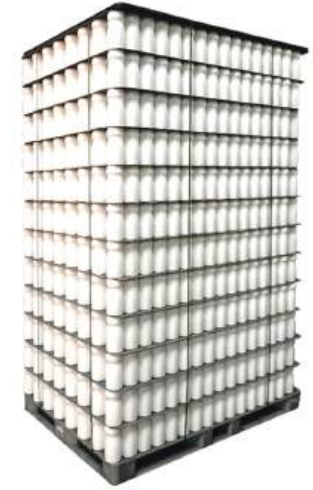


All our tray packing machines can be equipped with an optional space saving and economical leak tester!

PACKAGING PALLETISING

Palletising into trays or onto slip sheets, rather than into cardboard boxes, can decrease your overall cost tremendously. Not only are you using less cardboard, you are also optimising the packaging density of your pallets. Improvements of up to 33 % have been achieved. Automating this process is now within reach, with a semi-automatic palletiser reducing labour costs as well.

We have a broad range of palletisers.



TRAY FORMER

Machine to fold and glue cardboard trays automatically.

SEMI-AUTOMATIC PALLETISERS

Palletiser to pack empty products in trays with buffer table. Reduces manual workload by more than 80 %.

FULLY AUTOMATIC PALLETISERS

We have fully automatic palletisers:

- To pack empty products in trays with integrated tray warehouse.
- To handle stackable containers with or without roller conveyor going through.
- To pack empty products on flat slip sheets, single infeed.

We can also provide dust cap applicators. They place a dust cap on a plastic container and check if the dust cap is placed correctly. To be used in combination with our palletisers for stackable containers (DP290/DP300) and our quality centers (QC050/QC055).



PACKAGING

PALLETISING - DEPALLETISING

Discover our range of machines able to palletise, depalletise, or both.

SHEET PLACING UNIT

Modular and flexible concept which can be used for different applications.

SHEET PLACING UNIT FOR HIGH PERFORMANCE

Modular and flexible concept with high-speed servo drive for high-performance applications.

The following units can be surrounded by a complete set of equipment: safety fencing, automatic pallet transport, pallet dispensers, tray former, tray warehouses...

FLEXIBLE PALLETISING UNIT

Allows palletising and buffering.

FLEXIBLE PALLETISING AND DEPALLETISING UNIT

Modular concept which allows different applications: palletising, depalletising & buffering. Palletises/depalletises flat sheets, top frames, trays, hoods, pallets...



PACKAGING

TRAY WAREHOUSES

We have three warehouses:

BASIC TRAY WAREHOUSE

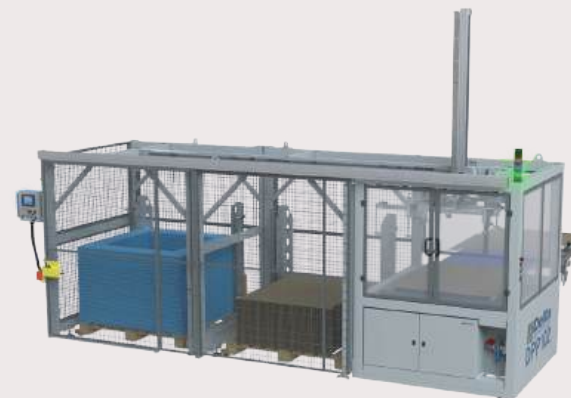
Simple tray warehouse with up to 10 positions. Easily adjustable thanks to open frame concept. Integrated or stand-alone unit. Can be added to different packing machines to obtain a fully automatic line.

ADVANCED TRAY WAREHOUSE, SINGLE VERSION

Tray warehouse with up to 24 positions. Can be used to store flat sheets, hoods or trays.

ADVANCED TRAY WAREHOUSE, DOUBLE VERSION

Tray warehouse with up to 24 positions. Can be used to store flat sheets, hoods or trays. This double version with pass-through mode enables manual infeed or bag pass-through on automatic palletisers and tray packers: this results in a multifunctional line able to bag, tray pack, use hoods and flat sheets.



PACKAGING

CASE PACKING

Discover our range of case packers:

MANUEL CASE PACKER

Packs empty bottles in cardboard boxes manually, in a neatly arranged way. Often used in combination with our standard tray packers. Easy to install and operate. Mobile system that can be swapped between production lines.

FULLY AUTOMATIC CASE PACKER

We also have fully automatic case packers. These are flexible machines which can handle a wide range of products. They prove particularly handy when packing bottles with unusual shapes in rows or layers, such as in the cosmetics industry. Easy setup and fast changeover times thanks to recipes.

- **Fully automatic case packer (per row)**
Rows of empty bottles are grabbed and put down in a cardboard box or tray. Useful for stacking conical bottles or puck line integration.

- **Fully automatic case packer (per layer)**
A full layer of empty bottles is grabbed and put down in a cardboard box or tray. Typically used for PET bottles. Features automatic box transport.



PACKAGING

TUMBLE PACKING

We set up a range of tumble packing machines:

SIMPLE TWIN BOX FILLING SYSTEM

Budget-friendly loading station for flexible silo with cooling option to avoid bottle deformation. It can be mounted on/behind each conveyor. This loading station has its own control system and is completely line-independent. Plastic bottles are counted and dropped into a box. Once the right number of bottles is reached, a flipper system diverts the bottles into another box.

TUMBLE PACK SOLUTION FOR BOXES

Packs products in boxes in a controlled manner. Each box contains an exact number of products. It is possible to fill the boxes in different steps to avoid deformation of the (still-warm) bottles at the bottom of the box.

TUMBLE PACK LOADING UNIT FOR SILOS

Silo filling system to fill two silos alternately. This gives the operator a big time span between interventions. In addition, it is possible to fill the silos in different steps to avoid deformation of the (still-warm) bottles at the bottom of the silo.

TUMBLE PACK LOADING UNIT FOR SILOS (COUNTING)

A variant of the above silo filling system counting the bottles upon exit, guaranteeing an exact quantity in each silo. Ideal solution when the bottles need quality control, as they are standing up on a conveyor.



PACKAGING SOLUTIONS

OUR SOLUTIONS

We offer a wide range of packaging solutions: silos, pallet boxes, pallet robots and flat sheets. The best solution for you depends on many factors. For example: transport costs, material costs, delivering one-to-one or one-to-many, storage space, bottles and products therein, etc.

During our decades of experience, we accumulated a lot of knowhow and developed several tools to help you decide what is the best packaging solution for you. Don't hesitate to ask us more about this service.



PACKAGING SOLUTIONS

SILOS

Silos greatly reduce the workload in environments with only few transports involved. These include:

- In-house productions: blow and filling bottles in the same building
- Nearby site production: blow bottles and the customer is nearby
- Internal storage solution for offline labelling, instead of online labelling

Silos make factories possible with dozens of machines and hardly any operators. They improve storage, on your side as well as at your customer's side, as you can stack them up to 11 meters (36 foot) high. Optionally, RFID-tracking will allow a smoother and shorter administrative cycle.

On the other hand, silos are less volume efficient: averagely, you can store 30% less products per cubic meter. However, it will not be in relation to the workload/packaging material/investment needed. Also, the pushing of newly fabricated and thus still warm bottles against each other, can cause product damages in some circumstances. Straps avoid this.

Silos are exceptionally suitable for non-food products, industrial packaging and in some cases even cosmetics.

FLEXIBLE SILO - HALF HEIGHT TOP OUTLET

Stores tumble packed products. Storage capacity of 1.2 m³.

FLEXIBLE SILO - TOP OUTLET

Stores tumble packed products. Full pallet height. Storage capacity of 2.5 m³. Unloaded using a DEP100 bottle unloader.

There are two versions available:

- Rigid version with PVC sides and kevlar reenforced straps
- Low cost version in woven PP, woven straps

FLEXIBLE SILO - BASE OUTLET

Stores tumble packed products. Full pallet height. Storage capacity of 2.5 m³. With kevlar reenforced straps to prevent bottle deformation.



The following products combine very well with our silos:

- **Centering frame for flexible silos**
Assures operators put the silos exactly on the right spot.
- **Empty bottle loading station for flexible silos**
Usually installed behind the blow moulding machine, in the empty bottle production area. With cooling option. Only suitable for silos DFS100 and DFS150 (silos with base outlet).
- **Empty bottle unloading station for flexible silos**
Placed onto the unloading station. Can unload automatically (operator free operation). Available in 1 and 2 silo positions. Only suitable for silos with base outlet (silo type DFS100 and DFS150).

PACKAGING SOLUTIONS

PALLET BOX & PALLET ROBOT

PALLET BOX

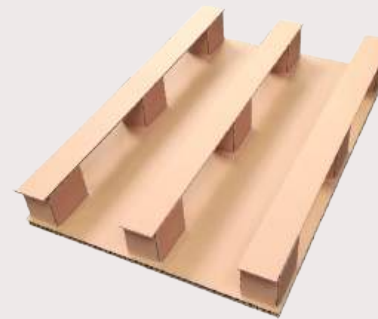
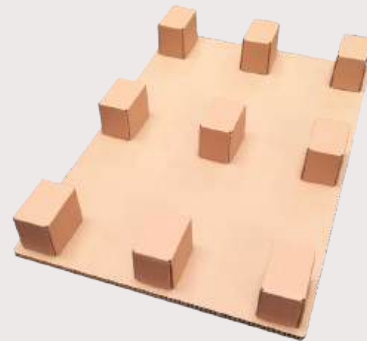
The pallet box consists of a plastic pallet used as a bottom pallet, a plastic pallet used on top and between them a cardboard foldable rim that fits in a slit in the pallets. When unpacking, the top cover is taken off and the cardboard removed.

The operator folds the cardboard together and returns it to you, together with the plastic pallets (which fit inside each other). No stretch wrapping needed.

With this solution, pallets can be stacked to full height, while the (even empty) bottles in the box remain fully protected.

PALLET ROBOT

Transporting ordinary pallets to you costs about 2 euro per pallet. We come with a solution whereby foldable, flat cardboard pallets are brought to you. This diminishes transport costs fiercely. In addition your pallet robot unfolds the cardboard pallets on site. That way, your pallets become 50 to 70 percent cheaper than before.



PACKAGING SOLUTIONS

FLAT SHEETS & HANDLE APPLICATORS

FLAT SHEETS

Blue, washable and returnable sheets to put in between layers on a pallet. Including a top frame to put on the top of the pallet once it is fully loaded. It makes a pallet extra stable during transport. Popular in medical and food sectors.



HANDLE APPLICATORS

Our handle applicators apply handles on shrink film packs, cardboard cases and other types of rigid packs.

We have two versions:

- **Entry level handle applicator**
Up to 800 BPH. Entirely new patented concept.
- **High speed, modular unit**
Up to 12.000 BPH. Snap-on or push-down linear heads available.

CONCEPTS

- **Snap-in concept**
Handles are bent to snap in place
(ASB concept handles)
- **Push-down concept**
Handles are pushed down from the top.
Available with both start/stop & on the fly technology.

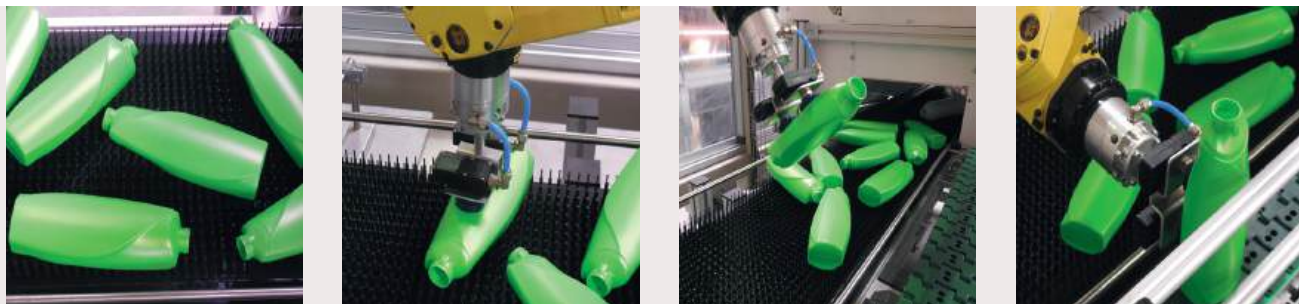
OTHER SOLUTIONS

UNSCRAMBLING & TAKE OUT SYSTEMS

UNSCRAMBLING

With vision systems, our robot unscramblers see how the bottles on the conveyor are positioned. That way they know how to pick each of them up and put them orderly in the right position, for example on another conveyor.

- **Bottle picker**
Bottle unscrambler to put the products on downstream conveyors after blow and drop machines, and for transport towards the filling lines. Handles different volumes of products (from 50 ml up to 5 l) and different shapes of bottles (round, oval and square). Available with one or two heads.
- **Pallet unloader**
Unloads pallets with bags or trays and puts the products into the bin of an unscrambler.
- **Debuffering unit**
Depalletizes round/oval bottles, up to 3.500 bottles per hour.



TAKE OUT SYSTEMS

We dispose of several technologies to take bottles out of the blow moulding machines. They are custom-made. For each machine, we have an appropriate solution.

FINISHING

FINISHING, CUTTING, MILLING, PUNCHING & LASER TRIMMING

Finishing (trimming away lost domes) is an important step. Our trimmers are designed so that we can change profiles easily for the different applications. Also, we can make them meet your requirements, for example when you already possess appropriate moulds.

Due to our experience, we can arrange for lower (height) domes. They can be a big saving, especially when using expensive materials such as EVOH. Or with bottles of lower height, to assure a low scrap ratio. The design of the lost dome and line is eminent for a good working process, critical for a good line OEE. Before starting a project, it is best to discuss this matter with us, as we have a lot of experience in this field. Send us the drawings including line speed and potential line design.

We can help you on different subjects :

- inner neck bore seal
- PET cutting
- base trimming...

CUTTING

Our range of cutters is able to deal with different shapes (round, oval, square, ...) and diameters. Scrap can be extracted and conveyed to be grinded and reused.

MILLING

Our neck trimming unit is fully automatic and trims necks of Coex bottles. Provides a smooth operation with high accuracy. This maintains the perfection of the neck, so that the cap will seal properly and doesn't leak.

PUNCHING

Our punching unit punches drain holes in the side of L-ring barrels. It is mainly used with faster machines or when customers desire multiple holes in the L-ring. Can be used in combination with our quality center QC060.

LASER TRIMMING

Our new patented laser cutting device trims round bottles in basically any material, including PET, PP, HDPE, ... Also with basically any wall thickness, resulting in a perfect, straight cut. High speeds can be obtained, up to 8000 BPH per head. Scrap is conveyed away externally so it can be grinded. The machine concept is rotary and designed to the latest food and safety standards.



CONVEYING

BOTTLE CONVEYING & PALLET HANDLING

We managed to build exceptional expertise in conveying bottles which are rather difficult to handle. We succeed doing that using vacuum, line control, very special chains, ...

BOTTLE CONVEYING

■ Flat belt conveyors

We can offer a complete range of flat belt conveyors. Available in different belt materials (PVC, food approved, more grip, etc.). Available with vacuum as well.

■ Chain conveyors

We have a complete range of chain conveyors. Wider versions available for containers and/or watering cans. Special chain for unstable and small bottles. We can also offer adjustable side guidings, which can precisely be set by means of a hand wheel or fully automatic with a servo driven motorised system. Moreover, we can provide side grip conveyors to transfer products from one conveyor to another.

PALLET HANDLING

Bring pallets to storage

■ Pallet roller conveyor

Roller conveyor suitable for transport of pallets in both directions. It can be integrated in packaging machines to obtain a fully automatic line.

■ Pallet duplicator

Machine to make a complete pallet out of two half height pallets with removal of the intermediate layer.

■ Pallet dispenser

Unit to dispense empty pallets onto a roller conveyor. It can be integrated in packaging machines to obtain a fully automatic line.

■ Pallet transfer car

Unit to transfer pallets over a longer distance without obstructing the access to other machines.

■ Pallet lift

The pallet lift brings the pallet from ground level to the level used on palletizers, stretch wrapping devices, etc.

CONVEYING ELEVATING SYSTEMS & LANE SWITCHERS

ELEVATING SYSTEMS

We are perfectly suited to provide you with solutions to elevate bottles and bags to a higher level, for example to overcome an obstacle.

- **Bottle elevator**
Completely shielded and safe solution to elevate plastic bottles to a higher level.
- **Bag elevator**
Elevator for bags. The products are transported on a high level.

LANE SWITCHERS

Some extremely high bottle speeds (for example, 40.000 BPH) make it difficult to handle them. Dividing them in, for example, 6 lines with 6.700 BPH each, makes it far more manageable and facilitates automation.



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BUFFERING

BUFFER SOLUTIONS

Buffering is very useful to achieve a high OEE. In case of problems, the bottles wait in the buffer until the problem is solved. The process goes on with a minimum of interruption. Also, it can prevent problems such as label shrinkage. There are different possibilities to buffer. Which one is best for you, depends on your product. Our staff is ready to give you appropriate advice.

BUFFER CONVEYOR

Solves bottle shrinkage issues when labeling, trepanning, ...

FULLY AUTOMATIC BUFFER TABLE

For empty bottles. Excellent solution after blowing lines and before filling and labelling lines (avoids machine stop when labels are changed). Bottles are buffered when needed and are transported through the machine or unbuffered as soon as possible.

COOLING TABLES

Buffering is not only useful in case of a problem, cooling of bottles can also be very useful to guarantee a strong and good looking adhesion of the label to the bottle.

Today's market with increasing speeds, in-line blow & filling systems, requires optimal buffer solutions in order to maintain maximum efficiency.



PROCESS

BENEFITS AND SAVINGS

WHAT'S IN IT FOR YOU?

At Delta Engineering, we tend to say: to measure is to know. And knowing leads to great benefits such as less need for energy, material and labor, predictive maintenance and enhanced production efficiency.

We developed a data logging platform to measure process parameters. It all starts with dedicated, small (4x4 inch) Intel-PCs: mini-PCs. They are connected to the machines that make up a line with controllers. Old machines can also be measured.

A line consists of, for example, packing equipment, quality control equipment, BM machines, dosing unit, grinder and blower. We integrate a line energy management device, if there isn't a suitable one already. The mini-PC logs the data of each of these machines individually and of the energy measurement device and integrates ERP data. You can choose to have every one of your lines equipped with such a mini-line PC.

We also use a dehumidifier, utilizing the latest state of the art technology. It creates an over pressure of 'dry' air inside the machine, in such way that the dew point inside the machine is brought below the actual dew point, thus preventing mould condensation. It modulates water flow, electronic expansion valve and a speed regulated scroll compressor.

Last but not least, our DDC200 server enters into play. It has an application for collecting data from each mini-PC (hence, from each line) and putting these in its database. As a result we obtain reports with tons of useful information. That leads to the benefits we were striving for: less energy, material and labour costs, better predictive maintenance and enhanced production efficiency.

**All our machines have been designed
to be flexible and
to be a long-term investment
in an ever changing market!**



COATING

SPRAY COATING

A coating is useful on many preforms and bottles, not in the least on those made out of PET. Spray coating is a frequently used method to apply this coating. We have spray coaters dedicated to preforms and spray coaters dedicated to bottles. They resolve all sticking issues on filling lines. Furthermore, they meet the latest standards in food safety.

ADVANTAGES

The benefits of coating bottles and containers are numerous. Amongst others, it greatly improves their barrier properties and, quite often, ensures their recyclability. In the meantime, it is more economical than other solutions. We provide solutions for preforms and bottles (or other containers).



COATING

PLASMA COATING

Plasma is one of the four fundamental states of matter, next to solid, liquid and gas. We present a new range of coating machines, based on PECVD (plasma-enhanced chemical vapour deposition). In general, CVD is a future proof coating technology. A mix of different gasses on different materials results in different barrier & surface properties. Question remains: choosing which kind of CVD? At Delta Engineering, we prefer plasma-enhanced CVD -PECVD- over thermally activated CVD. One of the reasons is PECVD can operate at lower temperatures. Also, PECVD enables an increased deposition rate. Some of our PECVD-solutions are dedicated to carbon coating. Others put fluorine coatings as well.

CARBON COATING ON PET

■ Advantages of carbon coating

Our carbon coating makes bottles less susceptible to ingress of oxygen (O₂) and loss of carbon dioxide (CO₂), and improves water vapour barrier as well. It is an inert layer, preventing any PET-related migrations (with for example acetaldehyde) towards the contents. The layer is also resistant to delamination, under, amongst others, hot and humid conditions. It increases the shelf life of products bottled in PET, and oxygen barrier improvement by a factor from 5 to 30. Furthermore, the coating is food grade.

■ Exhaust

We offer a PECVD-technology depositing thin films from a gas state to a solid state on a substrate, such as the inside of bottles. Our process exhausts a very small amount of gas, that, when necessary, can be captured completely using active coal filters. The appropriate properties of the coating are obtained by choosing the right mixture of gases injected in the bottle.

■ Our technology

PET often gets a carbon coating. To apply it with our plasma coaters has many benefits compared to other solutions, such as multilayers and plastic blends. This implies lower material cost, lower weight, recyclability and operational performance in production.

■ Applications

Thanks to our carbon coating, PET gets suitable for lots of chemicals, as well as drinks such as beer, sauces, water, tea, coffee, juices, sport drinks, etc.

FLUORINE COATING ON HDPE

■ Advantages of fluorination

Fluorine greatly reduces solvent permeation and chemical attack. It also reduces or eliminates paneling - the compromising, after some time, of the plastic walls of a bottle or container. Furthermore, it prevents container discoloration, reduces or eliminates odor emission as well as loss of flavour and fragrance. Moreover, it reduces or eliminates loss of active ingredients and interaction of the container with the product. These benefits are not restricted by size, shape or container manufacturer.

■ No scrubbers needed

Today, most technologies fluorinate by means of direct fluorination; however, this method is under pressure because of the dangers of escaping gas, which is not environmentally friendly and might intoxicate workers. Our new solution, however, brings on the scene fluorination using plasma treatment. Thereby, no fluorine gas gets into the atmosphere. Instead of fluorine gas, we use the non-ozone depleting R1234, a new and very common refrigerant.

■ Our technology

The enhanced barrier properties of HDPE bottles and containers treated with fluorine are lauded since long. Today, this often happens with direct fluorination, which use elemental fluorine, an extremely reactive gas. Our PECVD-machines, however, use harmless, chemically bound fluorine atoms.

■ Applications

Our new plasma coaters are quite helpful for products prone to hydrocarbon transmission through their HDPE packaging, such as the following those to contain acetone, agrochemicals, automotive additives, car care products, cleaning fluids, degreasers, d-limonene, essential oils, flavours/essence concentrates, fragrances, fuels, insecticides, lubricants, paint thinners, polishes, solvents, toluene waxes... and more.

We won't halt at providing good barriers to PET and HDPE. New solutions for other materials are in the pipeline, amongst others plasma enhanced coating of PP.



Improve your efficiency

Delta Engineering Inc

2880 North Berkeley Lake Road - Suite 3
Duluth, GA 30096
USA
sales@delta-engineering-usa.com

Tel +1 678 250 6356

www.delta-engineering-usa.com

Delta Engineering bv

Parkbos 1
BE-9500 Ophasselt
BELGIUM
sales@delta-engineering.be

Tel +32 54 51 81 11

www.delta-engineering.be

Delta Engineering Automation srl

Nr. 1, 133 street
Merisor RO-437349, Tautii Magheraus
ROMANIA
administration@delta-engineering.be

Tel +40 362 402 960

www.delta-engineering.be