# PACKAGING FOR THE MANUFACTURING INDUSTRY

PROTECHNIC
AN ENGELS GROUP COMPANY

ENGELS
serving logistics and the environment

# ENGELS GROUP

## HISTORY & COMPANIES

**1955** **Establishment of our company in Tilburg, The Netherlands.**

**1990** **We move to Son, close to Eindhoven, new building.**

**1997** **Start Engels Logistics NV (BE)**

**2000** **Move to Eindhoven, triple our warehouse space to 7.500 m2**

**2002** **We supply 80.000 plastic bins and 2.4 million blisters and seals for introduction of the Euro in Holland and Belgium.**

**2005** **Engels Manutention & Environnement SARL (FR) is launched.**

**2006** **Start of Engels Logística e Ambiente Unip (PT).**

**2008** **Take over of HLC Milieuservice, merged with Engels Logistiek BV.**

**2008** **Start of Engels Behältertechnik GmbH (DE) for production of underground containers**

**2011** **Take over Norah Plastics NV, merged with Engels Logistics NV**

**2012** **Engels logistics moves to it's new premises in Beringen.**

**2013** **Establishment of Engels Group NV, to support and manage the Engels Companies.**

**2020** **Engels Group and Engels Logistiek move to Park Forum Eindhoven, close to the airport.**

**2022** **Protechnic Ltd becomes part of the Engels Group**

**2023** **Group turnover passes €60.000.000 with 160+ staff in 6 countries.**

Engels Logistiek B.V. - Engels Group NV

Engels Logistics NV

Engels Manutention & Environnement SARL

Engels Logística e Ambiente, Lda


Engels Behältertechnik GmbH

Engels Protechnic Ltd.

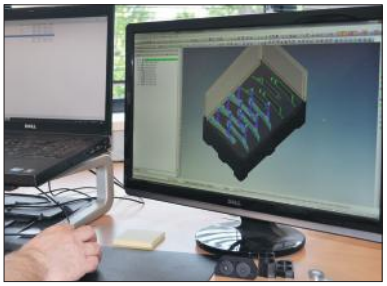
# CUSTOMISATION

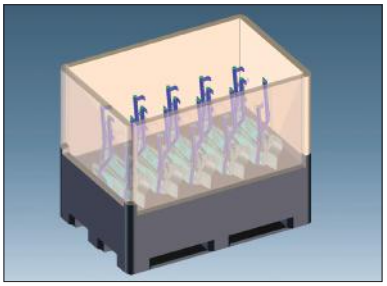
A third of packaging supplied by us consists of custom designed, manufactured and assembled products.

We have in-house production facilities, materials and resources. Both when purchasing single units, even per piece, but also for large series productions. This often involves adapting or adding to a standard product from our range, or developing completely new products.

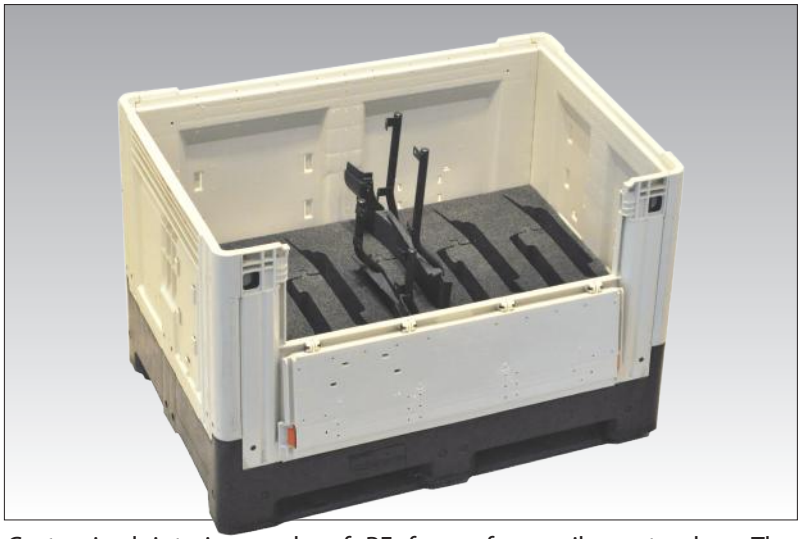
Engels has experience in producing and supervising the following disciplines:

- Design and project coordination of moulds for injection moulding, vacuum forming and rotary moulding
- Interiors/product carriers: foam, vacuum-formed, injection-moulded, textile and corrugated/fluted board
- Machining techniques such as: milling, sawing, welding, glueing and riverting
- Making combinations of the materials plastic, steel, corrugated plastic sheet, foam and textiles
- ESD safe and UN-approved products
- Undercarriages, wheels, couplings and tie rod systems.
- Hinges, closures locks
- Bar coding, printing and marking





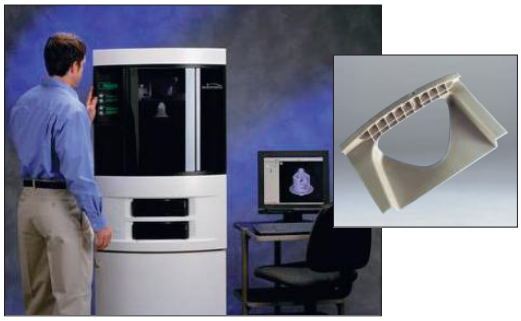
From active collaboration with the customer, our specialists formulate a defined question with requirements that the product must meet. After this, the product development department starts working on the design. Thinking along and delivering practical, sustainable and cost-effective products are the starting point. We have on more than 30 years of material knowledge and experience in supplying customer-specific products.



Customised interior made of PE foam, for spoiler extenders. The whole thing fits exactly into a 1200 x 800 mm Smartbox.

**Engels has its own production/assembly departments in the Netherlands, Belgium the UK and Germany.**

**Mirror welding machine for welding plastic products up to 1200 x 1000 mm.**



**It is often chosen to manufacture a 'one-to-one' model, a costly procedure. Fortunately, via CAD programmes controllable 3D printers, an example is now easy to manufacture in a few hours.**

# MANUFACTURING PACKAGING

# STANDARD PACKAGING

**Plastic transport containers**

As a basis for transport packaging within the industry, plastic bins and pallet boxes are often used. Engels Logistics has been a specialist in sustainable transport equipment for decades. We have listed some important secondary packaging for you: plastic bins, pallet boxes/volume bins, folding pallet boxes and shipping units.

**To reduce the large amount of packaging material, the VDA (Verband Der Automobilindustrie) decided in 1988 to introduce a bin pool, so-called KLT bins (KLT = Klein Ladungs Träger). The idea was good, but in the end every major brand still decided on its own version of this bin, mainly because of the high own weight of the first model.**

KLT bins are available in a wide range of standard sizes and designs.

**Pallet boxes/volume bins**

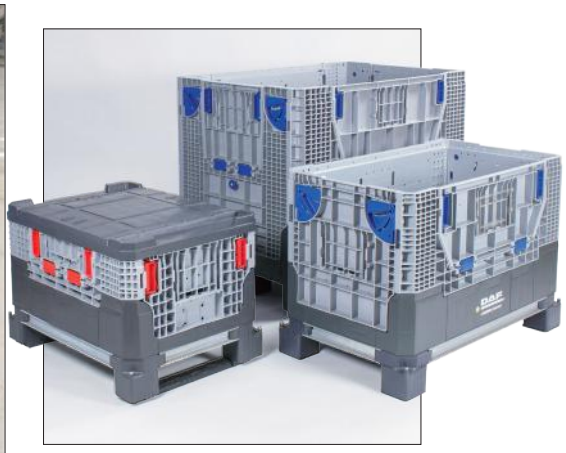
For packing large and heavier parts, we use plastic large-volume bins and pallet boxes. These bins are also a great solution for packing larger series in one package. We supply these bins in various sizes and suitable for both light and heavy loads.

Volume bin with cross-mounted wheels.

**Foldable pallet boxes**

As an alternative to our one-piece pallet boxes, we also supply a large range of foldable pallet boxes. Big advantage is that they save space both in internal storage and return transport. These pallet boxes are available in robust industrial versions and easy-to-clean hygienic smooth versions.

Foldable 'hygienic' pallet box with removable wall.



**Industrial foldable plastic pallet boxes (GLT) specially developed for automotive industry.**

**Shipping units**

Pallets with add-on walls are a logistically interesting alternative to pallet boxes. Their load capacity is much lower, but when folded they take up much less space. In addition, they have wider interior dimensions and are a lot cheaper than foldable pallet boxes with lids.

A big advantage of this solution is that the internal height of the packaging is reasonably easy to adjust.

Foldable 'pallet box' used by the Dutch army in Afghanistan.

**Multi-use transport packaging consisting of lightweight, hollow plastic pallets, plastic corrugated collars and plastic lids.**

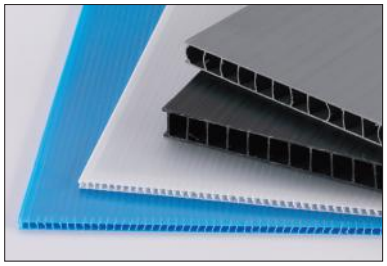
**Pallets with Aircell collars and lids combined with a foam interior to keep automotive parts in place.**

# MANUFACTURING PACKAGING

# CORRUGATED PLASTIC PLATE

Polypropylene corrugated board is perfectly suited for product carriers and compartmentalisation due to its low weight and high rigidity. The material can be milled and die-cut in larger series. Depending on the application, the choice of material is determined. There is diversity in thicknesses and specific weight.

**Plastic sheet material can be shaped just like corrugated cardboard. This creates an extremely light yet very strong sheet material, available in various thicknesses, strengths and colours.**



**Plastic corrugated platic board, various thicknesses.**

**Corrugated plate bins for storage/transportation of pipes at DAF Trucks.**

Corrugated plate insert in Automotive packaging.

Corrugated plate inserts combined with foam for interior part truck cabin.

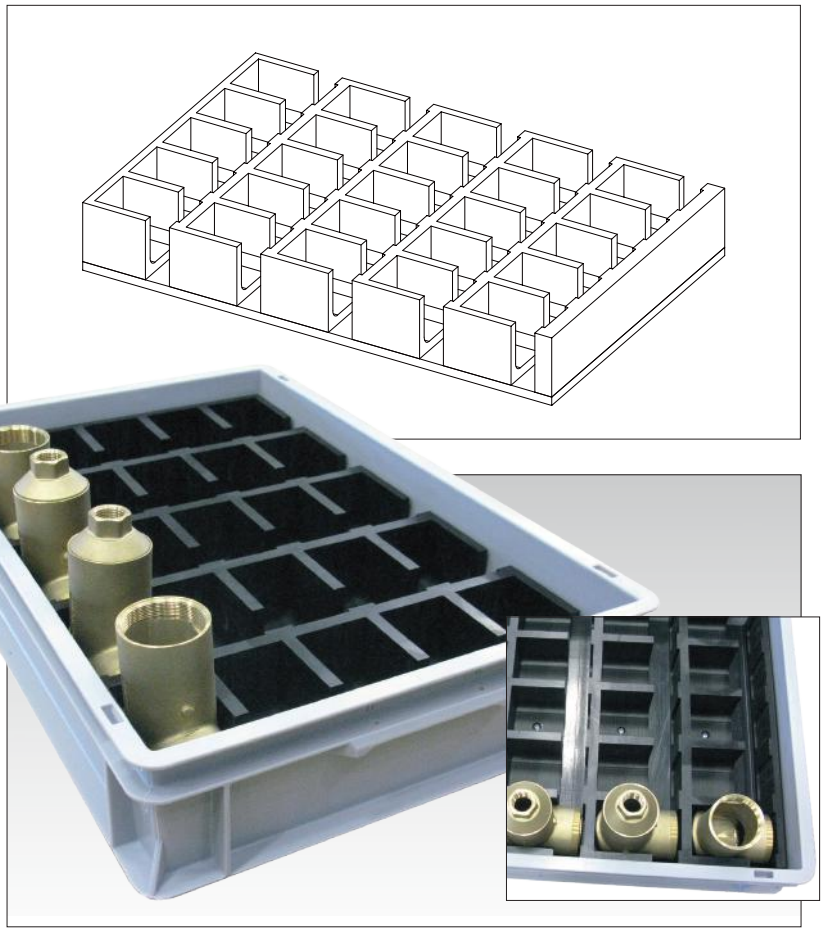

**Corrugated plastic plate bin with textile interior.**

Corrugated board is also suitable for manufacturing large containers. Especially if their purpose is to remain manageable for people. European regulations work towards a maximum regular lifting weight of 12 kg. We make a 600 x 400 x 100 mm bin, for example, from as little as 600 grams, 1000 grams lighter than a standard injection-moulded transport crate of the same dimensions. Using corner pieces and profiles, we manufacture large, strong and easily stackable customised transport containers. With either open or closed handles. Standard options include: label holders and printing.

# MANUFACTURING PACKAGING

# PRODUCT CARRIERS FROM PLASTIC

For heavier applications and solutions where high accuracy is a requirement, we manufacture product carriers from solid plastic. These plastic parts are milled to size and optionally fitted with inserts on which parts can be safely secured during transport. We mount these product carriers on plastic pallets, bins or steel frames.

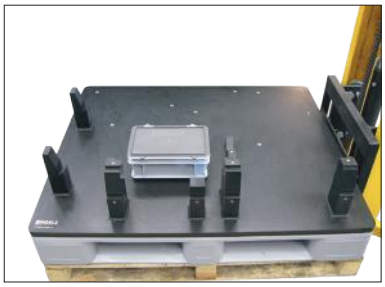


Plastic Euronorm bin containing a milled customised insert. This deployment positions the products so accurately that they can be handled by robot.

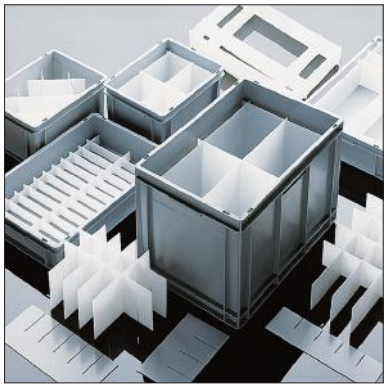
If required, we can also deliver our packaging in such a way that it is suitable for use in a clean room.

**Below are some examples of high-quality plastic product carriers:**

**Customised product carrier for syringes in medical sector.**



**Combination of standard plastic pallet and box with milled plastic parts.**



**Layouts made of unbreakable polyethylene. From 10 pieces upwards, we will make your compartments to measure.**

# MANUFACTURING PACKAGING

## FOAM INTERIORS

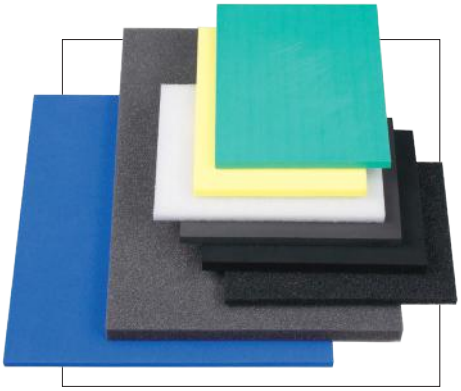
There are several options for packing fragile parts in foam. We have standard pre-cut foam blocks, from which it is easy to put together a suitable interior yourself. We also make customised interiors, based on supplied 3D models of the product to be packaged. If this is not available, the interior is custom-made from a supplied model.

To manufacture foam interiors in small to medium series, we use techniques such as punching, waterjet cutting, milling or contour cutting. Based on the application, we choose the right technique.

For manufacturing interiors in larger runs, we opt for mould-formed foam. A major advantage of this technique is that moulded parts with complex geometry can be realised. Examples of materials in moulded foam are EPP and EPS.

We apply foam interiors in our standard plastic containers, but also in our cases, for example. We also make foam interiors for larger packaging such as (collapsible) pallet boxes.

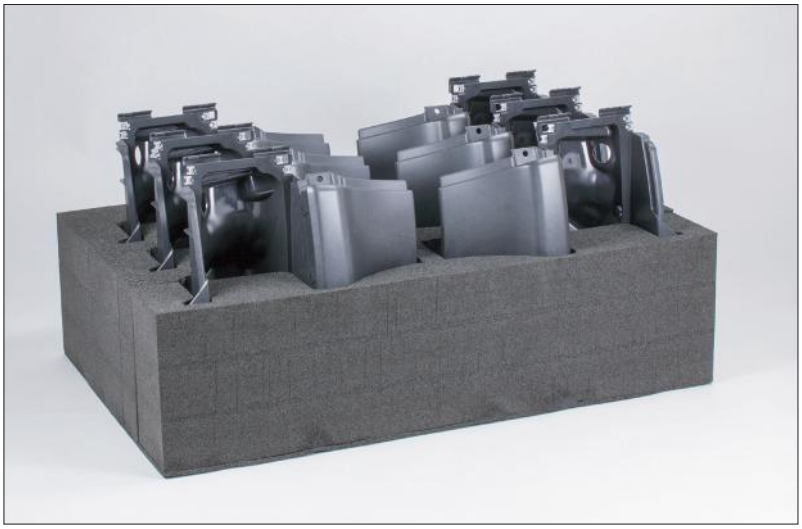
Foam is also used as part of a composition. Foam boards can be glued to channel boards just fine and used as a buffer or spacer.



**Depending on the application, we work with different types of foam.**

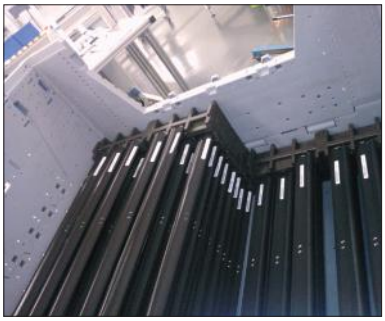
**Production of foam interiors.**

**RMA transport containers with hand customised foam interior so that terminals are shipped stable and shockproof. Label holders on the lid provide space for RMA information stickers, which are then easily removed.**



Foam interior for Scania, fitting into a pallet box.

Flexible interior serving car parts.



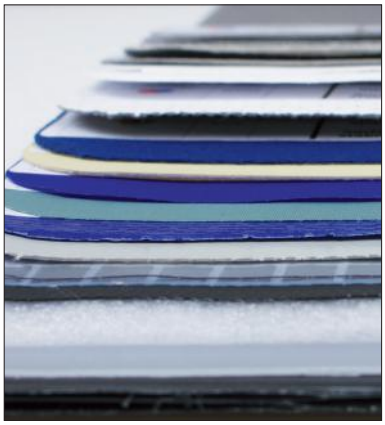
EPP foam for car sunroof blinds.

# MANUFACTURING PACKAGING

# TEXTILE INTERIORS

Textile interiors offer optimal protection to scratch-sensitive components. A big advantage is that they are flexible and therefore very suitable for products with complicated geometry. This flexibility also offers advantages for any return transport of empty collapsible packaging.

We offer a choice of materials, with particular attention paid to the scratch sensitivity of the products to be packaged. We supply the various textile interiors in various material strengths, each tailored to the product to be packaged.



**Various (combinations of) materials to protect the product to be packaged.**

A stackable cabinet for truck bumpers. For this, we combined various materials: a steel frame, plastic panels and Tyvek textile as the interior.

It is also possible to line textile interiors with materials such as channel board or foam. Corrugated plastic board can provide additional stability and foam for even better product protection.

The textile interiors can be mounted in standard plastic containers, but also, for example, in a custom-made container made of corrugated plate. We also apply them in larger versions, such as pallet boxes, foldable pallet boxes and metal racks.

Dispatch unit with textile interior and transparent fabric cover.

**When designing packaging, we use CAD software Solidworks to achieve optimal filling levels. The products to be packaged can be read into our software in various 3D formats such as Catia and Step.**

# MANUFACTURING PACKAGING

## STEEL

**Engels Behältertechnik GmbH produces metal products for the Engels group, such as underground and above-ground waste containers and accessories for transport bins and waste containers, in Selmsdorf with an experienced team and state-of-the-art machinery. Supported by creative mechincal engineers in the Netherlands, Germany and the UK, we offer tailor-made solutions. Both modifications and completely new products.**

"Silent" collection bin for steel scraps made of a metal frame with plastic panels. Designed for Volkswagen.

Custom-made steel inserts for wastewater pumps in Euronorm bin.

**Programming of laser cutting machine.**


**Welding of aluminium. Many of our products are made of aluminium because of its low weight and good corrosion resistance.**

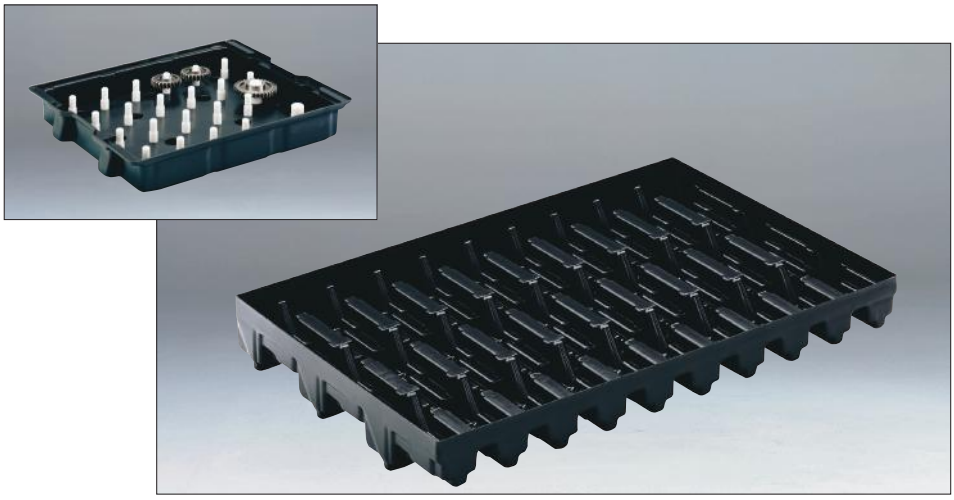
An all-steel product carrier for an agricultural vehicle component. The product carrier is adapted for use with a Smartbox.

# MANUFACTURING PACKAGING

# VACUUM FORMING

Because the forces that vacuum moulds have to withstand are only a fraction of those that injection moulds have to endure, they are also about 80% cheaper. Therefore, vacuum forming usually pays off for runs of 250 units or more.

For making tough, impact-resistant products, we take polyethylene. When shape stability and precision are important, we usually choose (recycle) ABS. Some examples:

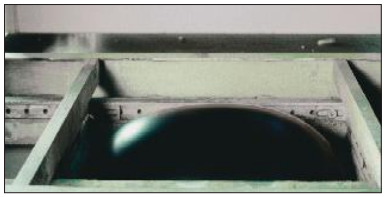


Product carriers made of recyclable ABS. The upper left example features additional pins for gear positioning.

Usually, a container with a vacuum-formed interior serves as a product carrier. The bin ensures stackability, the interior positions and protects the parts to be transported. This is relatively expensive, requiring two production runs for one package. We therefore invested in vacuum form moulds with changeable parts, which incorporate both functions: stackable product carriers.

Standard product carriers of 600 x 400 mm. We are happy to process sheet material, extruded in series of 1000 and more pieces, in your desired colours.

**Vacuum forming is a method of making a product from a sheet of plastic, such as a product carrier, a lid or a container.**



**The plate is clamped in the machine, heated and inflated like a bubble.**

**Then the mould rises and the air is sucked out of the machine.**

**The plastic merges around the mould.**

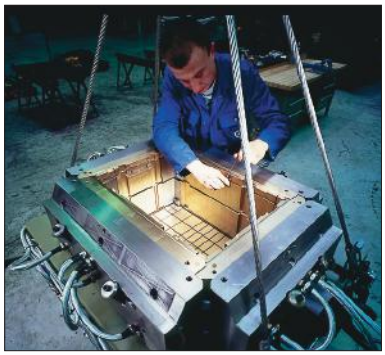
**After the product has cooled, the mould goes back down and the plate is removed from the machine.**

**The product, such as a bin or tray, is then detached from the sheet using a die cutter, band saw or router. The remaining sheet material is shredded to extrude new sheets from it.**

# MANUFACTURING PACKAGING

# INJECTION MOULDING

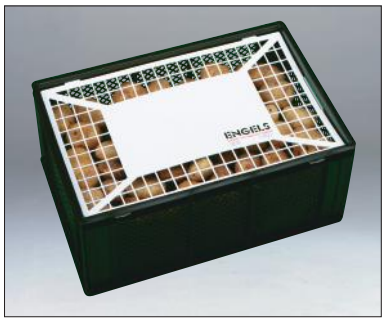
Injection moulding, from idea to totally new product, is the cheapest and most versatile method of plastic processing. A complete product or semi-finished product is created almost without human labour. Also, the freedom of design is greatest with injection moulding. Therefore, despite the high investment in moulds, injection moulding is often a justified choice. Below we show some realised specials:



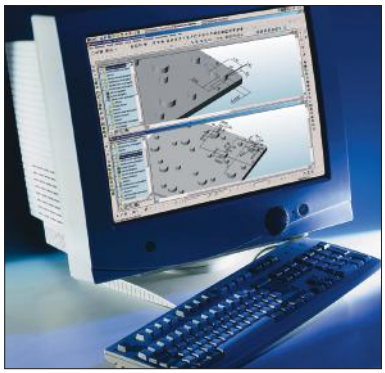
**Injection mould: shaping parts outside of a Eurotec bin.**

**Injection moulding involves pressing hot, viscous liquid plastic into a mould with extreme force. For a transport bin there arises a closing force of the mould of 100 tonnes.**

Ergonomic alternative, designed by order, to the heavy steel "Philips normal bin".

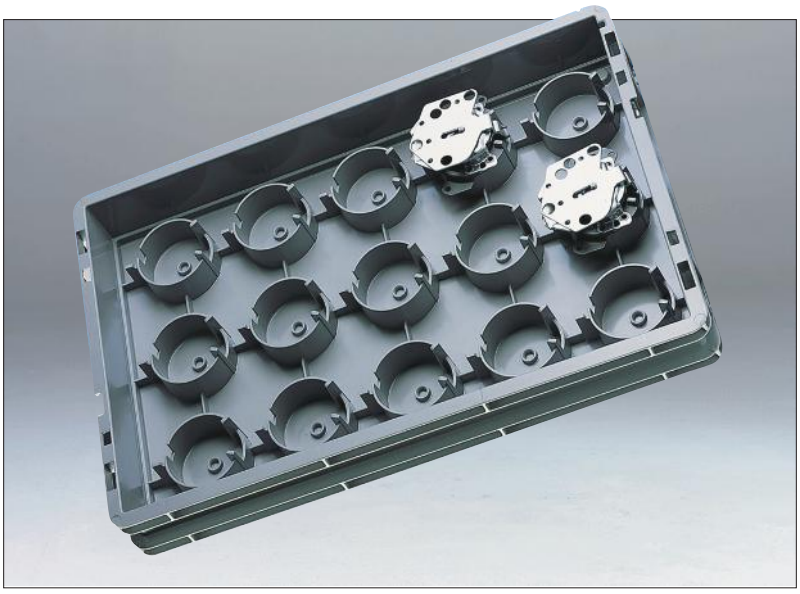



One-way sealable cover for export crates of seed potatoes.

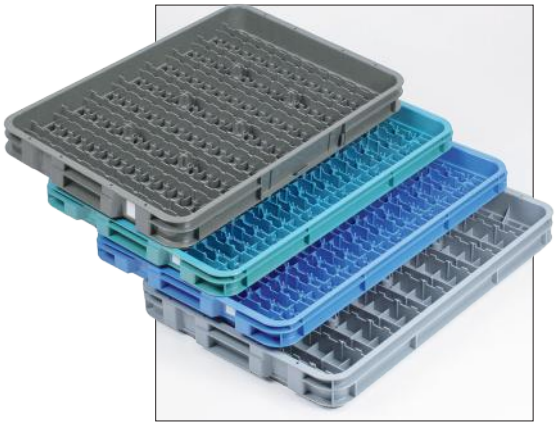


**Every mould is different and always takes weeks of engineering.**

We offer our customers the option of using standard moulds, into which we place product-specific inserts for them. In this case, it is only necessary to invest in a bottom part of the mould, resulting in significant savings. These standard moulds are available in a number of standard (Euronorm) dimensions.



Standard product carrier 400 x 300 mm. The outer shape is fixed, as is stackability on other product carriers. Only the interior is customised.

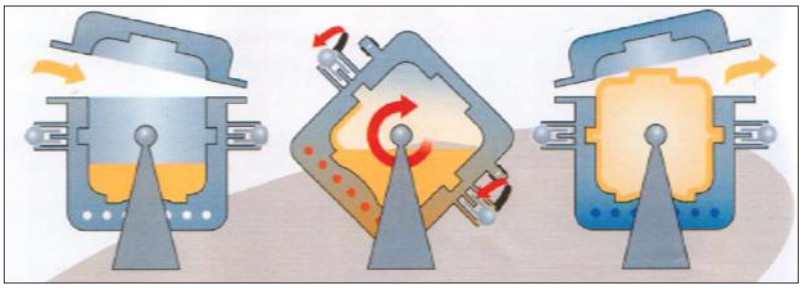


**Injection-moulded trays**

# MANUFACTURING PACKAGING

# ROTATIONAL MOULDING

Rotational moulding is a manufacturing technique to make a new product from plastic powder. The mould is heated between 250 and 300 degrees Celsius, causing the powder to melt. By rotating the mould about two axes, the molten plastic settles evenly against the walls of the mould. After cooling, the plastic retains the shape of the mould and a new product is made.



Schematic representation of the rotation process.

**Rotational moulding involves putting plastic into a mould, which is then rotated in an oven. The plastic spreads along the walls of the mould and melts there. The mould is then cooled again.**

**The mould is filled and then closed.**

**There are often several moulds on one arm.**

**The arm rotates in the furnace, the moulds in turn rotate around the arm.**

**After cooling, the hollow product is removed from the mould.**

Benefits of rotational moulding:

- A rotationally moulded product consists of one piece. This makes the plastic extremely strong and rigid.
- A unique product? Achievable with rotational moulding, at mould investments not in millions, but in tens of thousands of Euros. The mould of a rotationally moulded customised pallet box, for example, costs at most about 5% of an injection mould.
- In rotational moulding, the wall thickness is free. Products are as strong as you want them, without reinforcement ribs!
- Rotationally moulded products are completely smooth and therefore easy to clean.

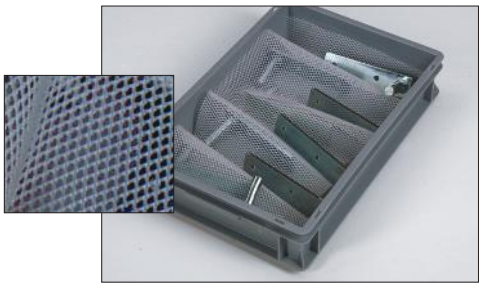
Diamond Drilling Services found the look and feel value of the current packaging particularly low and asked us for an alternative. We opted for rotational moulding because it allowed us to make packaging that could handle the requested load of 80 kilos without any problem. By adapting the bottom, the packaging of the assembly tool can be stored in it.

Fully custom-made plastic container for water samples.

# MANUFACTURING PACKAGING

# COMPOSITE PACKAGING

**Combine the methodologies shown on previous pages and the number of possibilities is endless. In industrial supply, disposable packaging is almost always a technically and economically nonsensical choice.**



**For small runs, the use of wire nets is an alternative for inte-ri-ors. Advantage: a sheet of ECM (anti-corrosion agent) conti-nues to do its job thanks to its open structure.**

**Supply to the automotive in-dustry: multi-use packaging of gearbox parts and gears (customer: VCST).**

**Daylight bulbs are delivered to growers in this bin with punched interior, broken bulbs go back to recycling in it.**

Bins for quality control: the vacuum-formed inserts oblige precise positioning of the dairy packs. The needle taking quality control samples always pricks in the right place (customer: Campina).

Transport container for heavy and expensive oil filter modules for trucks. The modules are frequently transported from the supplier and parts warehouse to the assembly line. The container is foldable which saves half in transport costs. The storage oil filter modules are placed individually in vacuum-formed product carriers. The rotationally moulded lid is contoured to fit three modules in one shipping container.

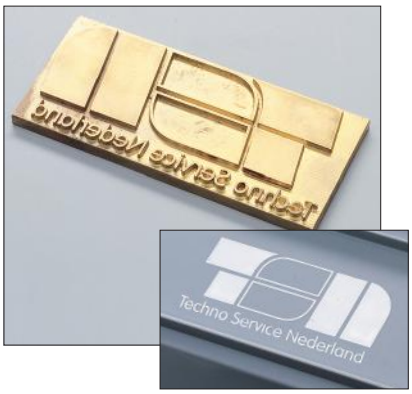
Plastic pallet with top wall and lid protect ABS units from dust and damage during storage and transport.

# PERSONALISATION

We prefer to hot-stamp containers with your name or other data. The paint melts into the plastic and some relief is created. A hotstamp is not removable with solvents.

Hot stamp machines. D.m.v. a heated stamp (approx. 200° Celsius), from an ink ribbon, the imprint is pressed into the tray (force depending on imprint surface, about 1,000 kilos).


Standard print, set.

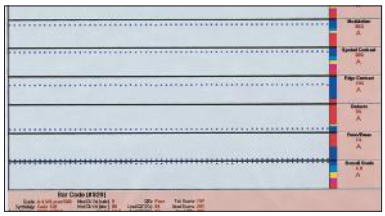



Customisation: printing by means of a cliché.

Machine screen printing of lids. The lid is placed under the screen by machine and the ink is printed automatically.

**For projects, we also provide barcode printing and application on bins, transport rollers, containers and the like. Because we usually need to guarantee 100% readability, an online quality check of every printed barcode is standard with us. We also provide adhesive barcode checking (2-sided identical and no duplicates).**

**Each barcode printed is scanned 10 times by default. The printer stops automatically when quality is insufficient.**



**Graphical barcode quality report. Here you can see average values, but zooming in on each label individually is possible.**

**Control arrangement for the purpose of legibility and prevention of wrongly pasted labels and duplicates.**

We supply a wide program "Serving Logistics and the Environment". Our product range answers all questions concerning warehouse and transport bins, storage systems, multiple use packaging, pallets and pallet boxes, retention bins, boxes approved for the transport of hazardous materials and plastic and steel waste containers. This supported by our electronics,

**TRANSPORT AND STORAGE BINS AND CASES**

**PALLETS AND PALLETBOXES**


**WASTEBINS AND CONTAINERS**

**SPILL PREVENTION**

The ISO 9001 quality certificate underlines the quality guarantee for design, development, production and service of Engels and Protechnic. Our ISO 14001 environmental certificate (for our main production unit) shows our concern for mankind's future.

JOSCAR REGISTERED

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Protechnic Ltd is a company within the Engels Group, a family business founded in 1960. The Engels Group thinks in terms of generations rather than short-term profit, the future of our planet is at heart. Our environmental programme underlines this.

Our true capital are our customers and our staff. We offer our customers state-of-the-art products at competitive prices, thereby building long-term relationships. At the moment (2023) we realize £55 million turn-over with 145 employees.

With offices in the Netherlands, Belgium, France, Germany, Portugal and United Kingdom.

ENGELS
serving logistics and the environment
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