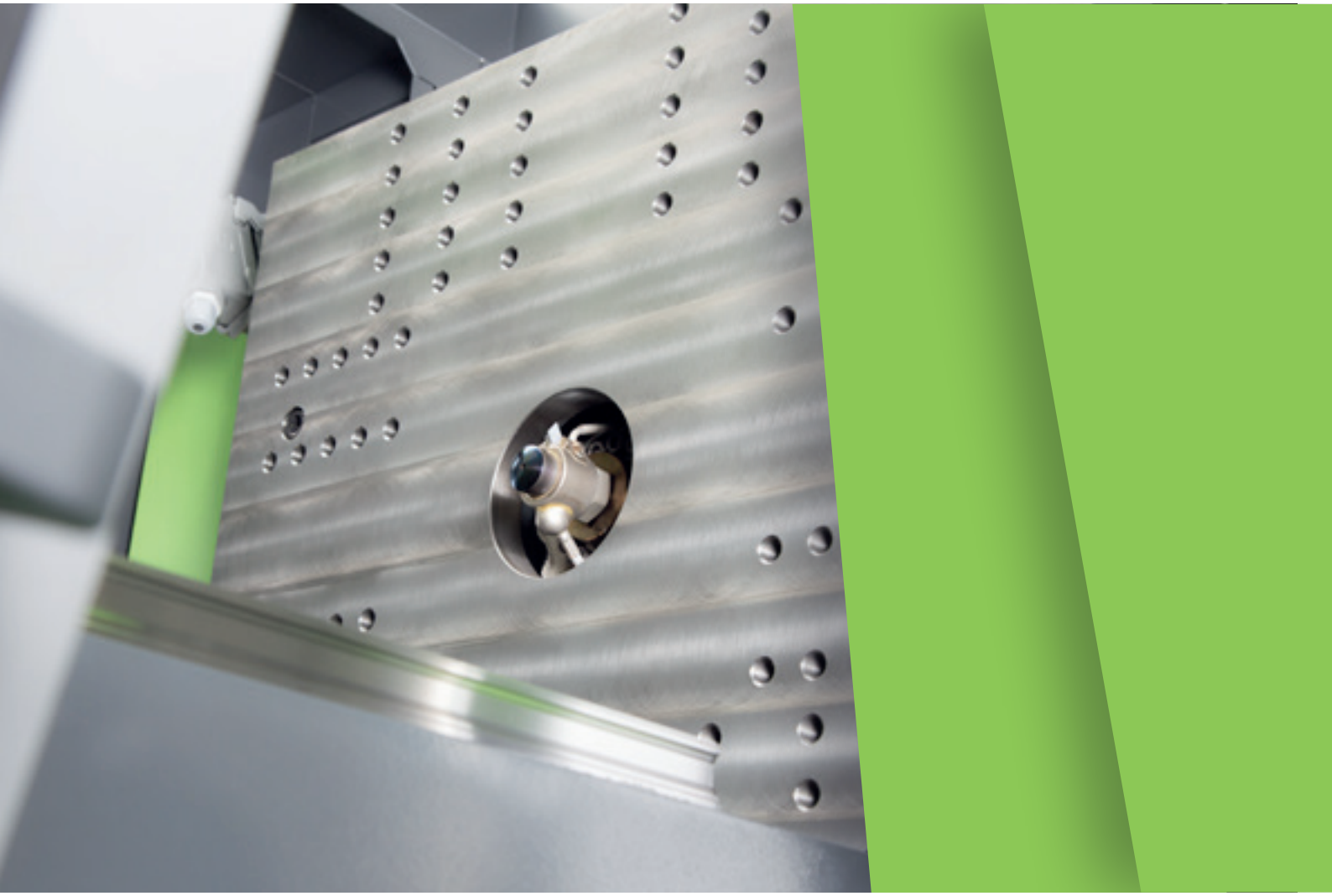
e-victory

The electric tie-bar-less



ENGEL

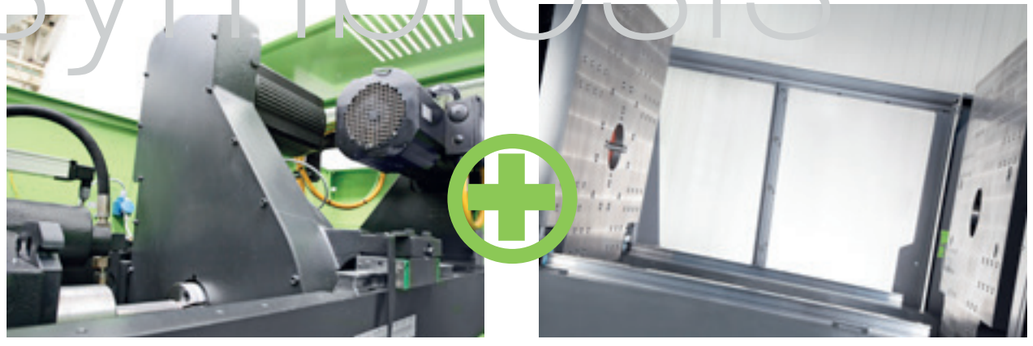
be the first

The perfect symbiosis

Electric + tie-bar-less = e-victory.

The perfect symbiosis

Electric + tie-bar-less = e-victory.



It's tie-bar-less. And it's electric. Like no other, the ENGEL e-victory effectively combines the best of both worlds. The machine brings together the highest level of precision – achieved thanks to the servo-electric injection unit – with the efficiency and cost-effectiveness of tie-bar-less technology.

The result is moulded parts of excellent quality exhibiting an **outstanding level of precision**. Manufactured with amazingly low energy consumption.

It is the machine best suited to technical parts with ultra precision requirements. ENGEL e-victory. The electric tie-bar-less.

Electrical precision or the efficiency benefits of tie-bar-less technology?

Extremely large mould dimensions possible
- Better utilisation of the barrier-free mould area.
- Ideal for large moulds or bulky core-pulls: the generously dimensioned mould fixing platens can be utilised to their limits (and often beyond)

Highest level of machine availability
- Faster mould changing due to shorter tooling times – even for high and bulky moulds
- Lower maintenance costs due to robust, low-friction design

Freedom of automation
- Faster part removal without obstruction for robots and handling devices
- Smaller footprint and lower ceiling heights thanks to free access to the mould area

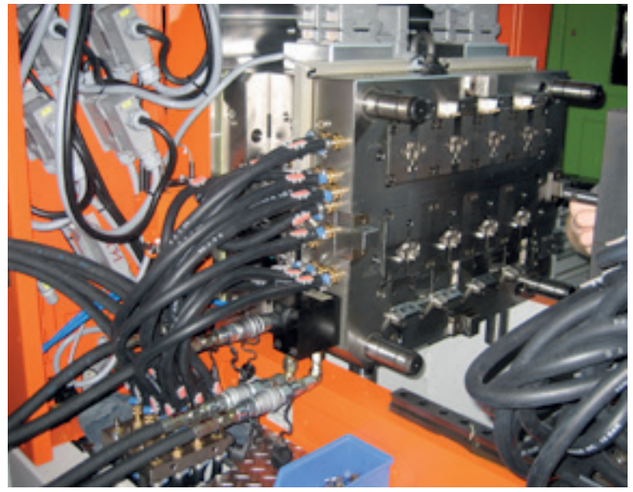
Minimum mould wear
- The patented ENGEL Flex-Link system and standard platen parallelism setting ensure unbeatable platen alignment

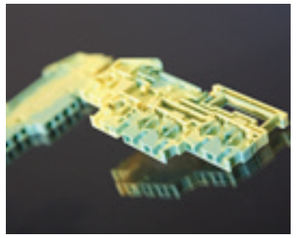
Precise injection moulding process with the electric injection unit

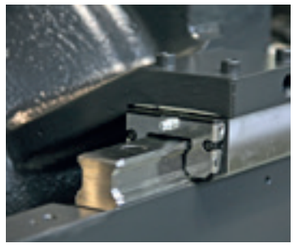
Outstanding energy efficiency
- Basic concept with extremely low friction losses. Electric injection unit and closing pressure lock-in provide the basis for low energy consumption
- The standard ENGEL ecodrive raises the energy efficiency of the ENGEL e-victory to the level of all-electric machines

Technical parts to satisfy the highest quality requirements
- The perfect clamping force distribution of the tie-bar-less clamping unit and the excellen process stability of the electric injection unit ensure that even the most exacting demands are fulfilled in the production of technical parts:
  - High quality surfaces of parts with long material flow paths in the cavities
  - High degree of dimensional accuracy and weight consistency with thin to medium wall thicknesses

Excellent clean room capability
- thanks to the tie-bar-less mould area and low-emission drive technology







Production with **machines which are one or two clamping force classes smaller.**

The mould size and not the maximum clamping force is often the key to optimum machine dimensioning. An exact calculation of the required clamping force pays off. The tie-bar-less machine has a smaller footprint and requires less investment costs, particularly with:

Moulds with multiple cavities

Non-full-surface moulded parts

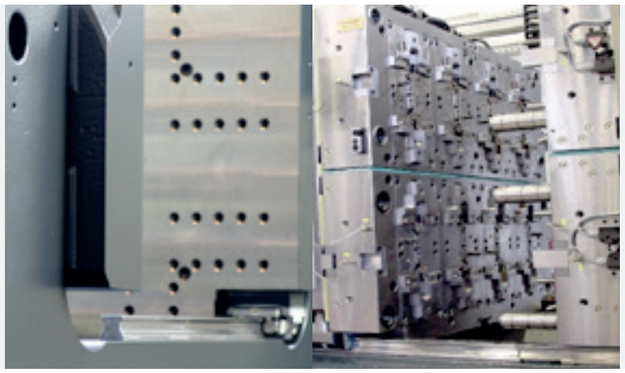
Multiple colour applications

The **most innovative** clamping unit of the past decades.

Benefits of the clamping unit

High-precision **mould parallelism**

Platen parallelism – and thus mould wear – in the tie-bar-less ENGEL e-victory is not left to the sum of manufacturing tolerances of the single components. Each tie-bar-less clamping unit is precisely set prior to delivery using the standard, highly sensitive platen parallelism setting.
Perfect platen parallelism even during motion is guaranteed by the precise 3-point guiding of the moving platen and the symmetrical mounting of the stationary platen to the base.
During clamping force build-up the platen parallelism automatically adjusts to mould parallelism. This **unique advantage** is implemented through the patented Flex-Link system.



Large **mould dimensions**

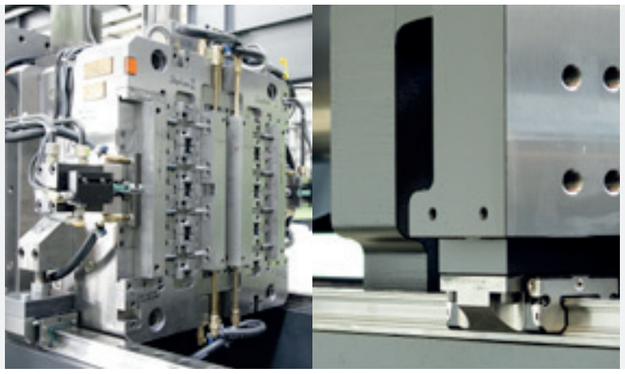
The standard version of the ENGEL e-victory tie-bar-less clamping unit already offers **greater freedom for the mould** than other clamping units.

Wider mould fixing platens and greater platen spacing are available as options if necessary. The mould area can thus be set to the next size with the same clamping force.

Heavy moulds

Heavy moulds are no problem for the tie-bar-less clamping unit. The high-precision platen parallelism is adequately ensured by the pre-tension of the patented Flex-Link system and the support through the massive C frame.

And by using additional guide shoes to support the moving mould halve, **mould weight can be increased virtually without limit.**



Outstanding **energy efficiency**

The basic concept of the tie-bar-less machine already guarantees maximum energy savings. In particular the **bearing-mounted precision guide rails,** absence of tie-bar friction and closing pressure lock-in significantly increase energy-efficiency.

Additionally, a substantial reduction in energy consumption is achieved by the **standard ENGEL ecodrive system.**

The **electric** ENGEL injection unit.

The guarantee for perfect product quality.

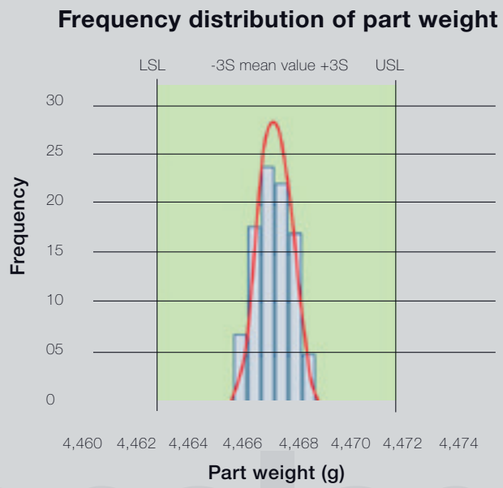



High-precision injection process control

The electric ENGEL injection units are characterised by **highly precise movement** during the injection process – in conjunction with a high degree of reproducibility. This enables you to achieve a significant increase in quality, particularly in the case of thin-walled products.

The **superior process stability** results in an extremely low reject rate. For you this means additional cost reductions and an increase in productivity.





Efficient servo-electric drive technology

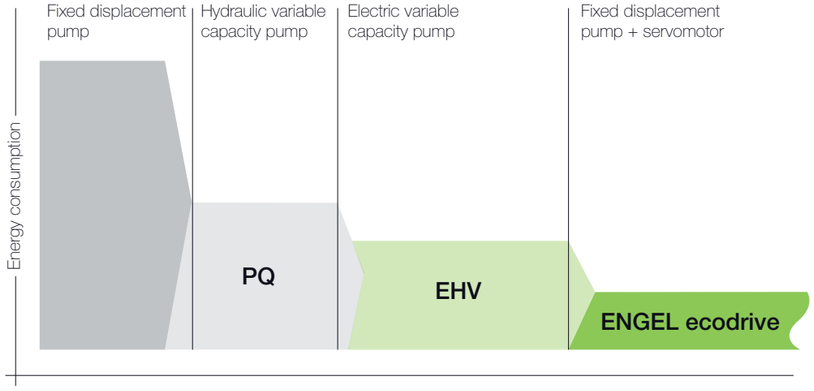
ENGEL makes no compromises in the choice of drive components. Only **high-quality components with an outstanding level of efficiency** are employed. Besides reducing energy consumption, this also guarantees excellent performance parameters and an extended service life.

In addition, parallel movements to all other machine functions are possible due to the independent actuation of the electrical motion axes (injection, plasticising). **This carries potential for high productivity.**

Plasticising unit

A range of barrel and screw configurations is available for **optimum tuning of plasticising to the application.** The barrel is mounted on the injection unit by means of a quick coupling. The plasticising unit is pressed torque-free against the mould; the required force can be set on the machine control unit.

Technology Process control



Evolution of hydraulic drive technology

Hydraulic concept
Focus on energy

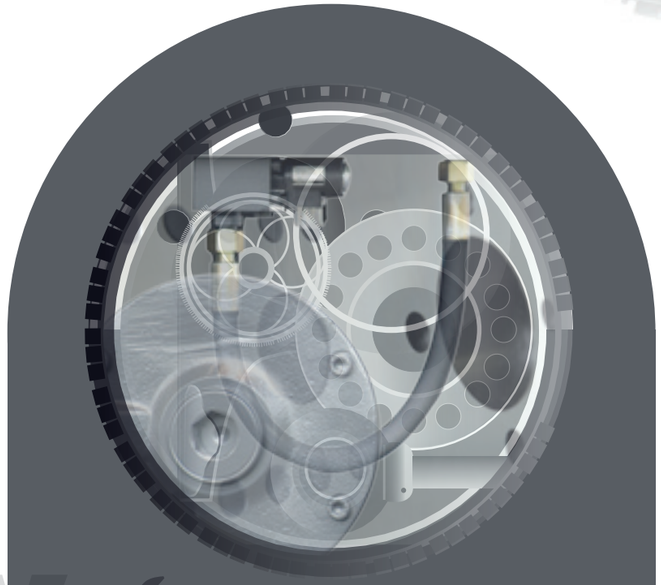
Focus on energy efficiency:

ENGEL is a pioneer in energy-efficient hydraulic concepts

Even more important than efficiency of the hydraulic drive components is the basic hydraulic concept of an injection moulding machine. Since the introduction of the tie-bar-less injection moulding machine ENGEL has had a concept that guarantees in itself **very low energy requirements** for the central hydraulic system of the respective machine.

Besides the particularly energy-efficient machine design, for many years ENGEL has also been committed to **highly efficient hydraulic drive units.** ENGEL already set the standard in energy efficiency and control quality over 15 years ago with the replacement of PQ hydraulics by modern EHV hydraulics.

Thanks to the **new ecodrive servohydraulics**, ENGEL now combines the advantages of hydraulics with those of servodrives. ENGEL ecodrive offers additional improvements in precision control and thus represents a milestone in energy efficiency.



ecodrive *inside*

The perfect combination: electric injection unit and ENGEL ecodrive.

Whereas hydraulic accumulators with relatively high energy consumption were used in the past, ENGEL now offers high-performance electric injection units with injections speeds of up to 450 mm/s. But only in conjunction with the ENGEL ecodrive, as otherwise the stand-by losses of the parallel hydraulic pumps would cancel out the energy savings of the electric injection unit. **The ENGEL e-victory is equipped as a standard with the ENGEL ecodrive.**

"Lock-in" closing pressure

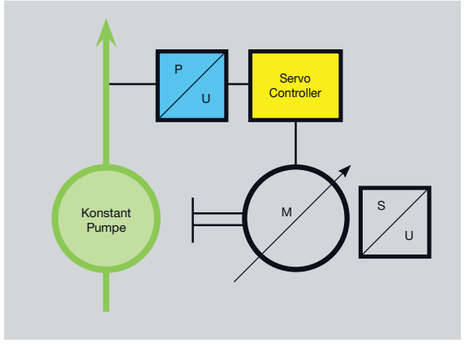
It goes without saying that all speeds and pressures of the individual hydraulic machine movements are regulated. But where it makes sense – holding clamping and nozzle contact force – the required pressure is hydraulically maintained and thus the so-called **holding energy is reduced to zero.** With increasing cycle time, the energy savings grow to a respectable level.

The "new" hydraulics - ENGEL **ecodrive**

Up to **70% energy savings** compared to conventional hydraulic machines
Up to **100% cooling water savings** for the oil cooler

ENGEL ecodrive - a revolutionary hydraulic concept with decisive advantages:

- Excellent energy efficiency
- No or substantially lower cooling water requirements
- Extremely low noise level
- Optimum for clean room applications
- On-board hydraulics for operating core-pulls



The ENGEL **ecodrive:** The system.

The ecodrive system in the ENGEL victory consists of a **servomotor with fixed displacement pump** (instead of a permanently running asynchronous motor with variable capacity pump). Energy efficiency depends on various criteria, of which two should be highlighted here:

No control valves
Each control valve causes energy losses due to the pressure differential. The ENGEL ecodrive controls speed and pressure without control valves, which produces **considerable efficiency gains.** The speed is controlled via the fixed displacement pump speed without additional pressure and energy loss. A unique feature is the closed loop pressure control by means of completely new control algorithms directly via the speed of the pump and no longer via a pressure control valve.

Drive standstill when operations stop
When at a standstill, the ENGEL ecodrive eliminates idling and purging energy consumption as occurs in conventional hydraulic systems . **An idle pump consumes no energy.** This is substantially supported by the energy-efficient machine concept (e.g. closing pressure lock-in).

Reduction in energy dissipation
ENGEL ecodrive **boosts energy efficiency** by radically reducing the energy dissipation common to conventional hydraulic machines. The portion of supplied energy that is not applied as movement energy for individual machine movements is transformed into heat. The majority of this heat is transferred to the hydraulic oil and via the standard oil cooler to the external cooling water processing plant.

ENGEL ecodrive **reduces energy losses** to such a high extent that – with the exception of high performance applications – only minimal heating of the hydraulic oil occurs. Cooling water consumption at the oil cooler is reduced to a minimum, in many cases to zero.

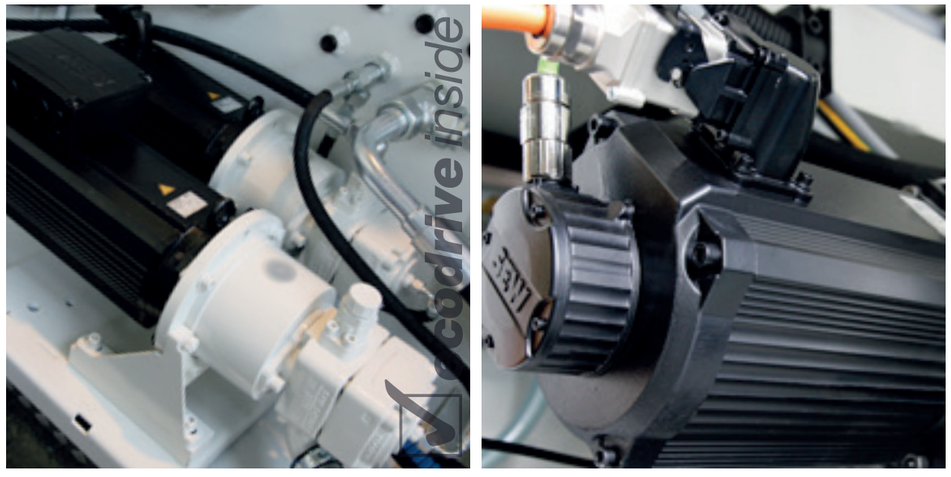
Due to the low energy losses, up to a clamping force of 2200 kN the standard ENGEL e-victory **no longer requires an oil cooler**.

The "noiseless" machine.
The elimination of permanently running hydraulic pumps considerably reduces noise emissions.

Ideal for clean room applications
The ENGEL e-victory is extremely suitable for cleanrooms alone due to the tie-bar-less technology and elimination of friction. An additional advantage is offered by the ENGEL ecodrive. The servomotors used do not have motor cooling fans, and thus there is **no air turbulence** resulting in a higher particle concentration.

"On-board" hydraulics
ENGEL ecodrive offers all the prerequisites for energy-efficient and **space-saving production with hydraulic core pulls.** For parallel movements of the ejector, core pulls and nozzle, ecodrive can also have two completely independent drive units.

Oil temperature = indicator of energy efficiency

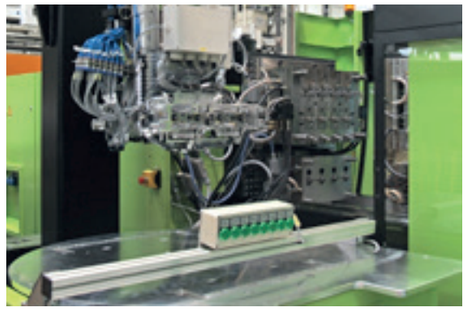


Robots and automation:
Increased efficiency due to tie-bar-less technology

The injection moulding machine is in many cases only **one element of the overall, often complex production cell.** Robot and automation components perform a variety of tasks. These range from insert-placing and take-off actions at the injection mould, including mounting and checking operations, to packaging of the finished product.

The aspect of cost-effectiveness is usually founded in the overall concept and not its individual components. This is precisely where the tie-bar-less ENGEL e-victory has **a critical edge:**

Robot control = machine control: because ENGEL supplies injection moulding machines and robots from a single source, full integration of the two control landscapes is guaranteed without the need for a Euromap 67 interface. The RC 300 robot control unit is integrated into the machine control unit CC 300 as a subsystem.



Smaller footprint
Because there are no tie-bars in the way, the robot can move in and out of the mould horizontally when the safety gate is open. The automation can thus often be installed closer to the machine. This **saves valuable floor space** in your production area.

Low ceiling height
The ENGEL e-victory can produce **without problems or risk of collision** in low halls or beneath crane runways, because the robot does not need to move out of the mould in an upward direction.

Shorter production cycle
The cycle time is shortened due to the direct, horizontal in- and outward movements of the robot, particularly in the case of complex automations. **With a clear focus on higher productivity.**

Integrated automation
Tie-bar-less machine technology is ideal for machine-integrated automation. The robot always moves within a slightly widened machine safety gate. After short horizontal movements it places the parts onto a conveyor belt directly adjacent to the mould fixing platens. The benefits: smaller footprints, lower system height, smaller robot sizes and the elimination of additional safety guarding for each robot **secure lower investment costs and better utilisation of the production hall.**

Sprue take-off
The ENGEL e-victory offers optimum conditions for **reliable and fast sprue take-off by the sprue picker.** Sprue ejection chutes are available as an option for the non-operator side safety gate.

Market leader and pioneer in **multi-colour injection moulding**

ENGEL combimelt – now with the precision of electric injection units

Market leader and pioneer
Market leader and pioneer in **multi-colour injection moulding.**

The tie-bar-less advantages of ENGEL e-victory machines can be fully exploited for moulds in multi-colour applications. In most cases the mould is relatively large, whereas the required clamping force is relatively small. The relatively low clamping force requirement is due to the very small sum of the projected surfaces of the cavities.

Particularly here, the **generously dimensioned and barrier-free mould area** offers more flexibility in machine dimensioning and mould changing.

It is especially important to take tie-bar-less technology into account in the concept phase of a project. **This saves time and costs.**

ENGEL **e-victory combi**

- The precision machine for multi-colour applications
- Additional electric injection units in W-, V- and L-position
- High degree of flexibility and plenty of space for an optional rotary table or index plate
- Increased mould installation height
- Rotary table with servo-electric drive unit
- Energy-efficient ENGEL ecodrive drive technology
- Comprehensive range of options, including customised solutions
- CC 300 control unit

The right combination of units for each application

No matter whether large shot weights, small footprint, low system heights or full freedom for automation are called for, ENGEL combimelt is the right multi-colour machine for every application.

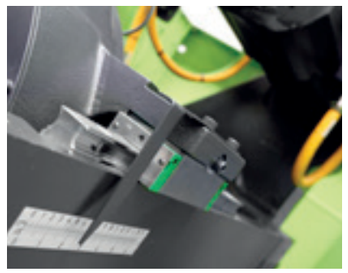
The right technology for every part

All multi-colour mould concepts are optimally supported by the ENGEL e-victory. Index plates, slide technology, co-injection, servo-electric rotary tables or the picking and placing of parts by a robot.

Overview of all-electric machines

The high-precision ENGEL e-victory machine series.

The guarantee for top quality and energy efficiency.



The tie-bar-less ENGEL e-victory precision machine covers the clamping force range from 280 to 5000 kN.

ENGEL e-victory			50			170			310		440		740			940			1340			1640		2440			3440	
			15	18	20	22	25	30	30	35	35	40	45	50	55	50	55	60	55	60	70	60	70	60	70	80	70	80
	kN	US tons																										
e-victory 28	280	30																										
e-victory 40	400	45																										
e-victory 50	500	55																										
e-victory 60	600	65																										
e-victory 70	700	75																										
e-victory 80	800	85																										
e-victory 90	900	100																										
e-victory 110	1100	120																										
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e-victory 300	3000	340																										
e-victory 350	3500	400																										
e-victory 400	4000	450																										

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