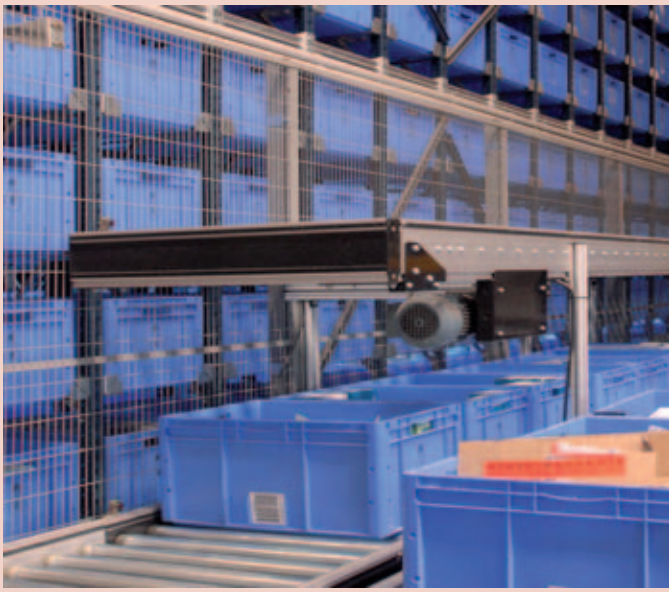


Conveyor Systems for Boxes



MECALUX

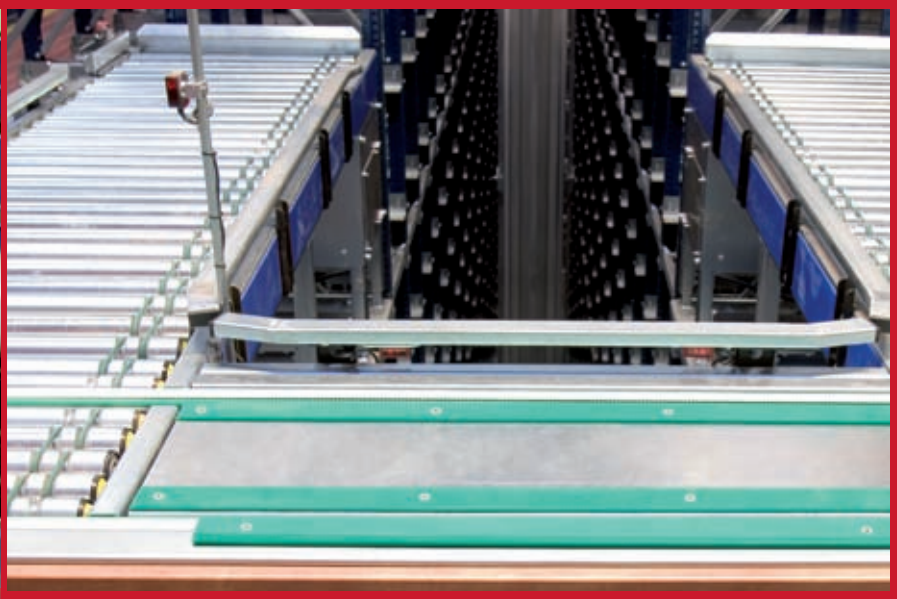




The conveyance of light loads is commonly combined with demanding requirements in terms of functionality and frequency which can only be met with the seamless integration of each and every component of the system.

Mecalux offers a conveyor system which is scalable to the needs of its users and adjustable for growth.









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Driving system of conveyor
Operation system
- Drive roller
- Chain
- Toothed belts
- Belt conveyor
- Drive shaft and chain

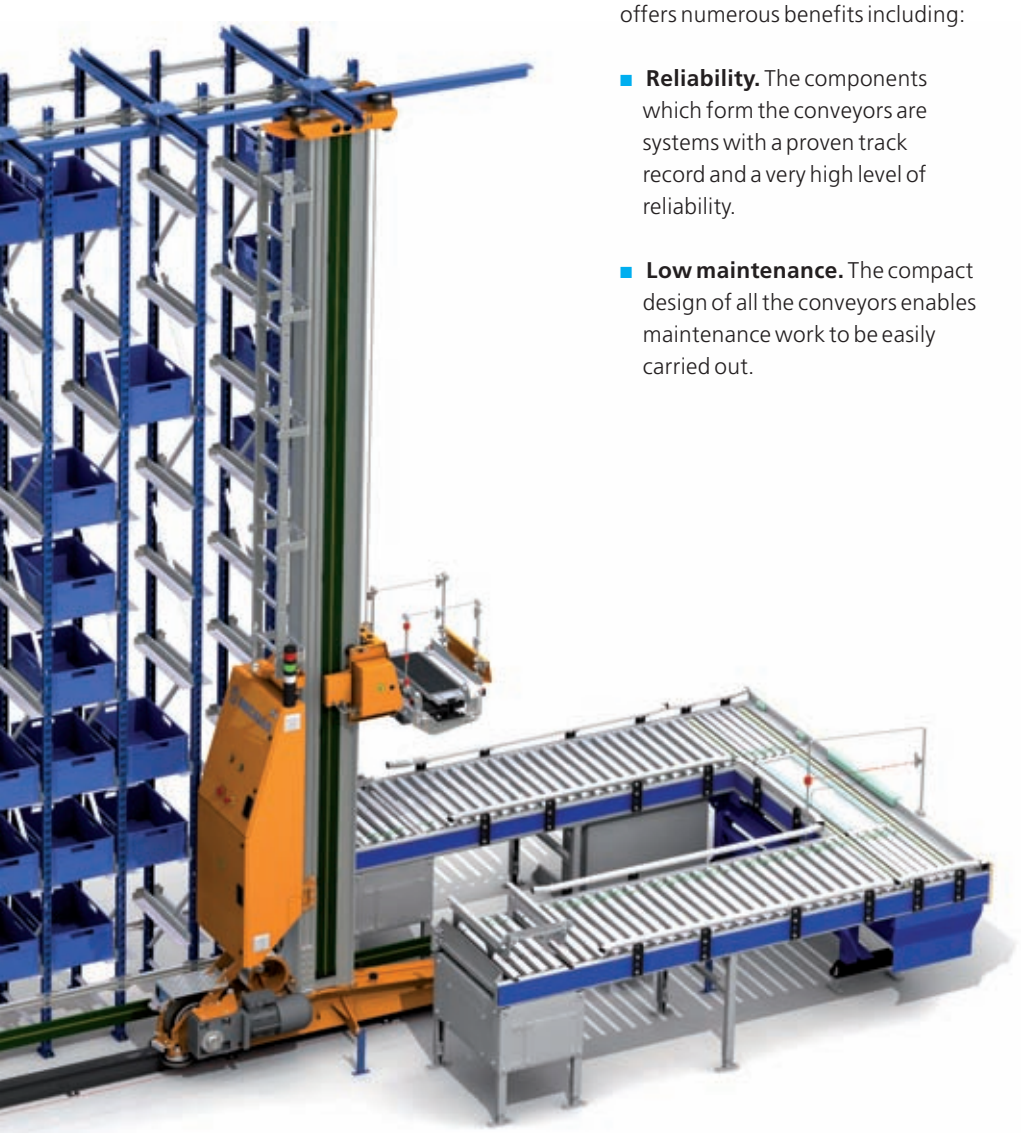
Type of drive
Conveying elements
- Rollers
- Belts
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Morfologi of conveyor systems

Goods to be handle 90

Handled unit
Working conditions



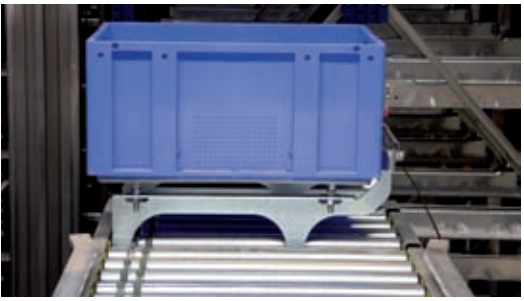


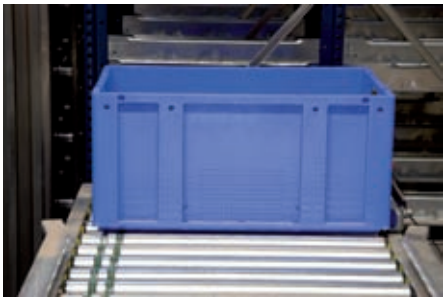
A continuous conveyor system for boxes offers numerous benefits including:

- **Reliability.** The components which form the conveyors are systems with a proven track record and a very high level of reliability.
- **Low maintenance.** The compact design of all the conveyors enables maintenance work to be easily carried out.
- **Low operational cost.** The efficacy offered by these systems in the working environment has a very positive effect on the return on investment of the whole of the installation.
- **Scalability.** There are many different possible configurations of the components involved. Any of the components of the installation can be reused or expanded.
- **Durability.** the robust system is designed to withstand daily work at a high performance level.
- **Ergonomics.** The system features all the ergonomic guidelines, facilitating interactions of the machine with the operator. It also simplifies the maintenance work in the installation.









Transport units

The box transport systems developed by Mecalux accept several types of units and transport bases:

Materials

- Cardboard
- Plastic

In addition to adapting to different size boxes according to the application

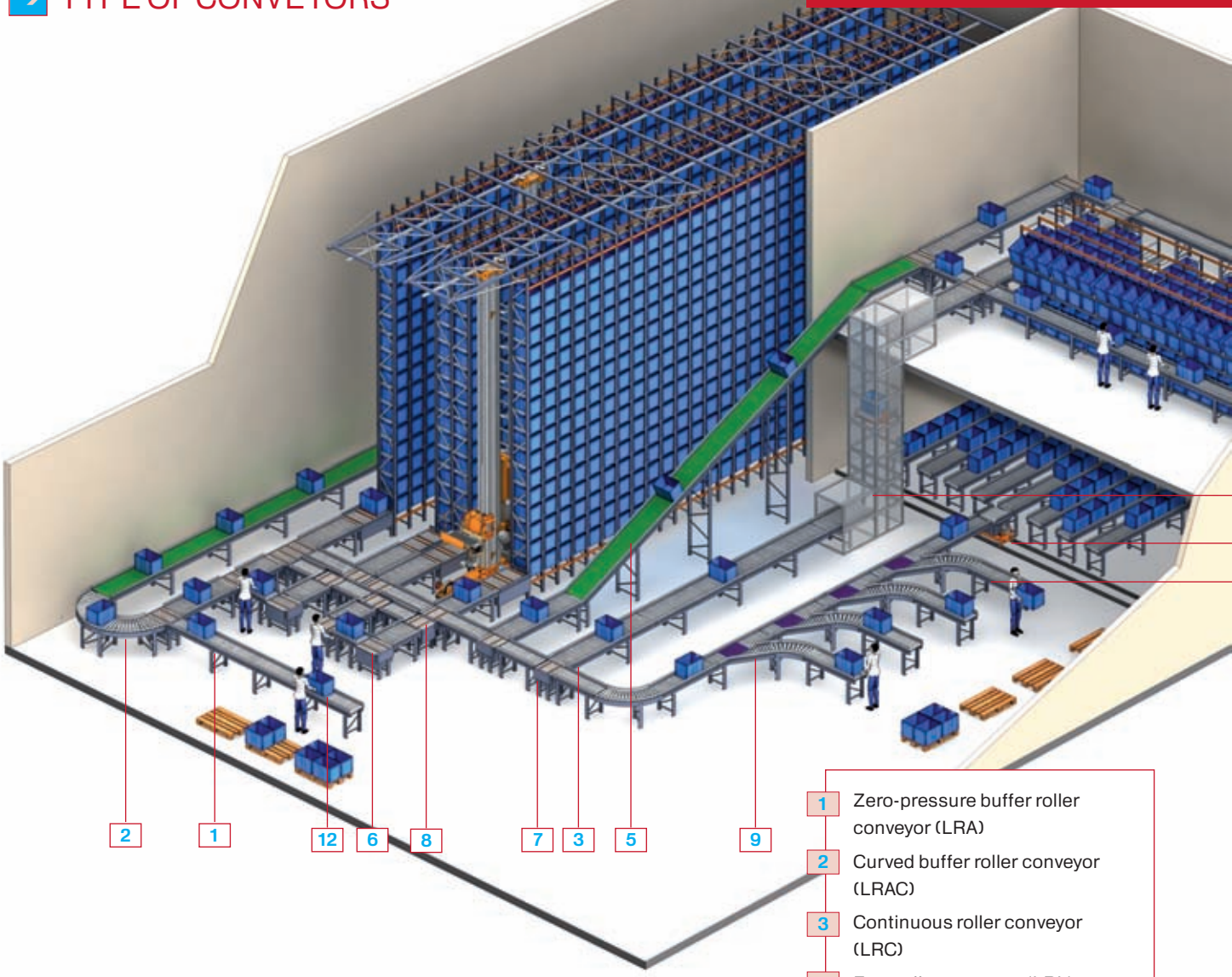
- Boxes with standardized measurements (Euroboxes). Mecalux features a wide range of plastic container types (see corresponding catalogue).
- Different sized-cardboard boxes using universal width which can adapt to a wide variety of weights and sizes. These load units do not imply any changes in the transport system.





The size of the load units and their transport base, together with its dimensions, are the chief factors used to determine the best conveyor system. Functionality, speed and incline are also factors which help to determine the optimal type of system for each application.

TYPE OF CONVEYORS



1. Zero-pressure buffer roller conveyor (LRA)
2. Curved buffer roller conveyor (LRAC)
3. Continuous roller conveyor (LRC)
4. Free roller conveyor (LRL)
5. Continual belt conveyor (LBC)
6. Roller conveyor with delay lifting (LEE-1L)









Buffer roller conveyor (LRA)

Enables the transfer of boxes in a straight line without them touching and is able to carry out stacking functions.

Its robust design is highly reliable for all work environments. The environmental conditions described on the technical data chart are those allowed by standard models, but these can be extended with the installation of the right guards.

7 Double conveyor with delay lifting (LEE-2L)
8 Roller and belt transfer (LTM)
9 Switch and exit/entrance conveyor
10 Conveyor transfer carriage
11 Lifts stations
12 P&D stations

TECHNICAL DATA / **Roller conveyors (LRA)**	
Transport units allowed	Cardboard and plastic boxes and trays
Max. weight of the load unit	100 kg
Min. length of conveyor	525 mm
Max. length of conveyor	3,150 mm
Max. exterior width of conveyor	947 mm
Max. useful width for boxes	800 mm
Min. length of box (longitudinal direction)	250 mm
Max. length of box (longitudinal direction)	800 mm
Standard transport speed	25/45/60m/ min
Standard conveyor heights	570/750 mm
Maximum slope	0°
Working conditions	Room temperature from 0 °C to 40 °C





Curved buffer roller conveyor (LRAC)

It is very useful of have these curved transport units when having to draw non-straight flow lines or overcome any type of architectural or structural obstacles.

It allows boxes to be moved along directional changes at various angles, with standard curve configurations of 45°, 90° and 180°. These conveyors can be combined together.

TECHNICAL DATA / **Roller conveyors (LRAC)**	
Transport units allowed	Cardboard and plastic boxes and trays
Curve angle	40°/90°/180°
Buffer areas 45°/90°/180°	1/1/3
Max. weight of the load unit	100 kg
Max. exterior width of conveyor	711 mm
Max. useful width for boxes	600 mm
Min. length of box (longitudinal direction)	250 mm
Max. length of box (longitudinal direction)	800 mm
Standard transport speed	25/45/60 m/min
Standard conveyor heights	570/750 mm
Maximum slope	0°
Working conditions	Room temperature from 0 °C to 40 °C

Continuous roller conveyor (LRC)

Used to move boxes in a straight line when it is necessary to have a constant load flow and the loads can accumulate by contact. It also is a system well suited to transporting loads over long sections or even with slight inclinations.

The continuous roller transporter, as opposed to the buffer conveyor (LRA), functions with a single motor that provides enough traction to maintain a continuous flow of loads that is optimal for covering long distances at a high flow rate.

TECHNICAL DATA / **Roller conveyors (LRC)**	
Transport units allowed	Cardboard and plastic boxes and trays
Maximum weight per liner meter	100 kg/m
Min. length of conveyor	2.000 mm
Max. length of conveyor	30.000 mm
Max. exterior width of conveyor	747 mm
Max. useful width for boxes	600 mm
Min. length of box (longitudinal direction)	250 mm
Max. length of box (longitudinal direction)	800 mm
Standard transport speed	25/45/60 m/min
Standard conveyor heights	570/750 mm
Maximum slope	6°
Working conditions	Room temperature from 0 °C to 40 °C



Free roller conveyor (LRL)

This is a system of rollers without a motor, suited to channel sections accumulating through gravity, expediting areas or work posts.





Roller conveyor with delay lifting (LEE-1L and LEE-2L)

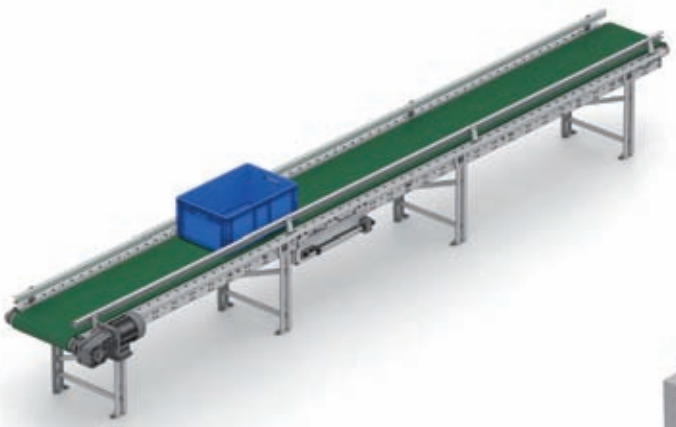
Specially-designed conveyors for picking and delivering loads at incoming and outgoing stations at automated warehouses using stacker cranes.

These conveyors are available in two families, mono-load and bi-load, perfectly adapting to the picking systems of the standard Mecalux stacker cranes.

This system combines a roller conveyor and a hoisting group that can access the crane's LHD through the bottom of the load.

TECHNICAL DATA / **Roller conveyors (LRL)**	
Transport units allowed	Cardboard and plastic boxes and trays
Max. weight of the load unit	100 kg
Min. length of conveyor	1,000 mm
Max. length of conveyor	12,000 mm
Max. exterior width of conveyor	747 mm
Max. useful width for boxes	600 mm
Min. length of box (longitudinal direction)	250 mm
Max. length of box (longitudinal direction)	800 mm
Standard conveyor heights	570/750 mm
Maximum slope	Variable
Working conditions	Room temperature from 0 °C to 40 °C

TECHNICAL DATA / **Roller conveyor with lift-out**		
	LEE-1 (single)	**LEE-2 (double)**
Transport units allowed	Cardboard and plastic boxes and trays	Cardboard and plastic boxes and trays
Maximum weight per liner meter	50/100 kg/m	2 x 50 kg/m - 2 x 100 kg/m
Conveyor length	700/900 mm	1.064/1.264 mm
Conveyor width	565/765 mm	690/890 mm
Min. length of box (longitudinal direction)	250 mm	250 mm
Max. length of box (longitudinal direction)	800 mm	800 mm
Standard transport speed	25 m/min	25 m/min
Standard conveyor heights	750 mm	750 mm
Height increment for lifting run	90 mm	60 mm
Working conditions	Room temperature from 0 °C to 40 °C	Room temperature from 0 °C to 40 °C



Continual belt conveyor (LBC)

Useful for moving boxes in a straight line when a constant flow of boxes is required, maintaining them at a constant distance or position from one another. It likewise is apt for sections with slopes of less than 24°.

This system is also well suited for a required transport speed higher than 60 m/min or when the adherence between the load surface and rollers is insufficient.





Mixed roller and belt transfer (LTM)

Offers high-performance solutions to intersection problems and adapts to the most complex facility design.

This system can change directions by 90° and combines a fixed roller conveyor and lifting belt conveyor arranged orthogonally, as well as having a built-in swinging buffer to ensure the boxes being transferred stay perfectly in line.

According to the length the belt conveyor has to cover in one direction, there is a choice of using a symmetrical system (requires a greater transport distance) or an asymmetrical one (requires a shorter distance).

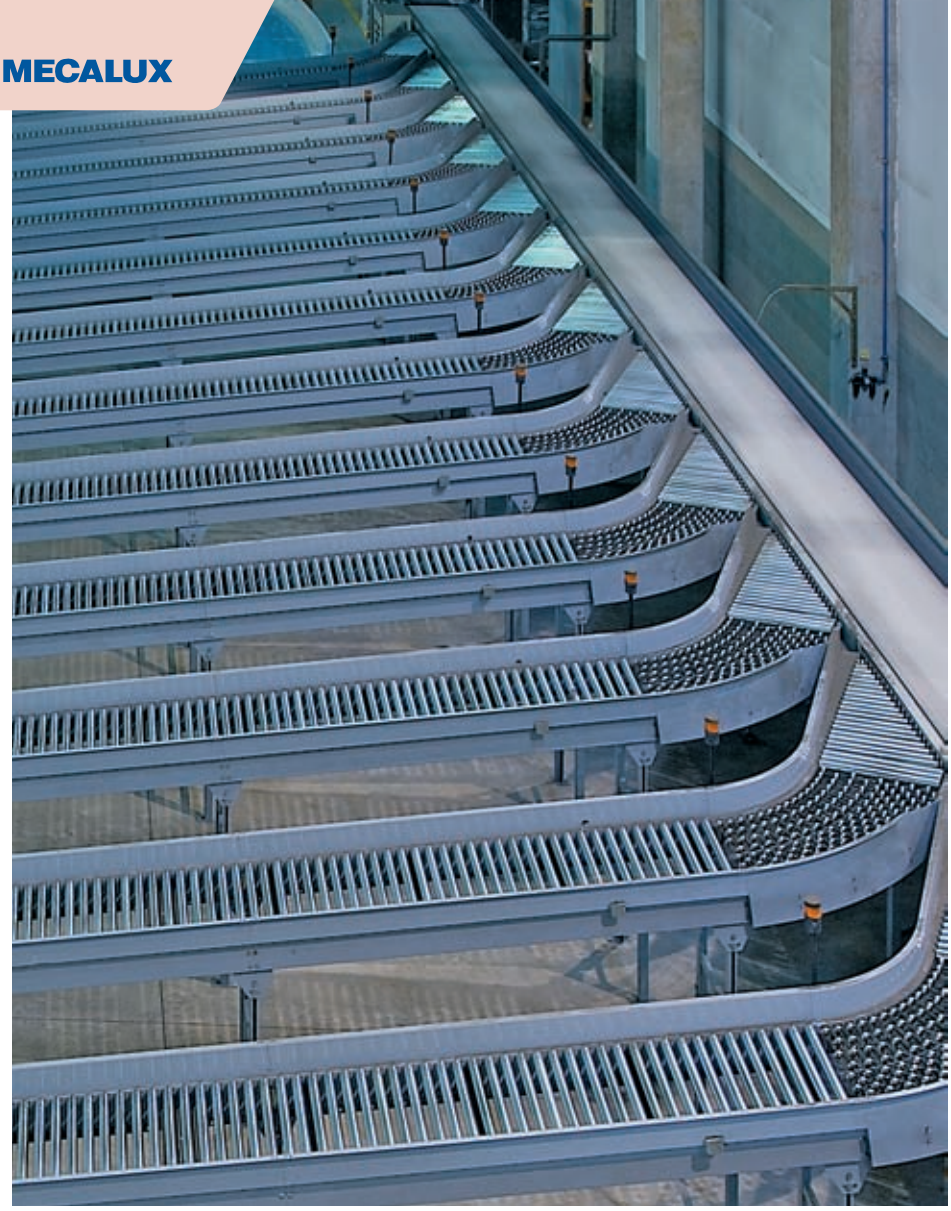
It can be used to move boxes and make changes in the transport direction at various angles with standard curve configurations of 45°, 90° and 180°, which may be combined together.

TECHNICAL DATA / Straight transfers between roller and LBC belt

	Line 1 straight and inclined	Line 2 straight	Line 3 straight and inclined
Transport units	Cardboard and plastic boxes and trays		
Maximum weight per liner meter	50 kg/m		
Min. length of conveyor	675 mm	4,500 mm	4,500 mm
Max. length of conveyor	4,500 mm	20,000 mm	30,000 mm
Max. exterior width of conveyor	747 mm		
Max. useful width for box	600 mm		
Standard conveyor heights	570/750 mm		
Speed	60/120 m/min		
Maximum slope	12°	0°	24°
Working conditions	Room temperature from 0 °C to 40 °C		

TECHNICAL DATA / Straight transfers between roller and LTM belt

Transport units allowed	Cardboard and plastic boxes and trays
Max. weight of the load unit	100 kg
Max. exterior width of conveyor	723 mm
Conveyor length	685/885 mm
Maximum load width of the rollers	600 mm
Min. length of box (longitudinal direction)	250 mm
Max. length of box (longitudinal direction)	800 mm
Standard conveyor heights	570/750 mm
Standard transport speed/ Transfer flow at 90°	25/900 m/min 45/1,300 c/h
Maximum slope	0°
Working conditions	Room temperature from 0 °C to 40 °C

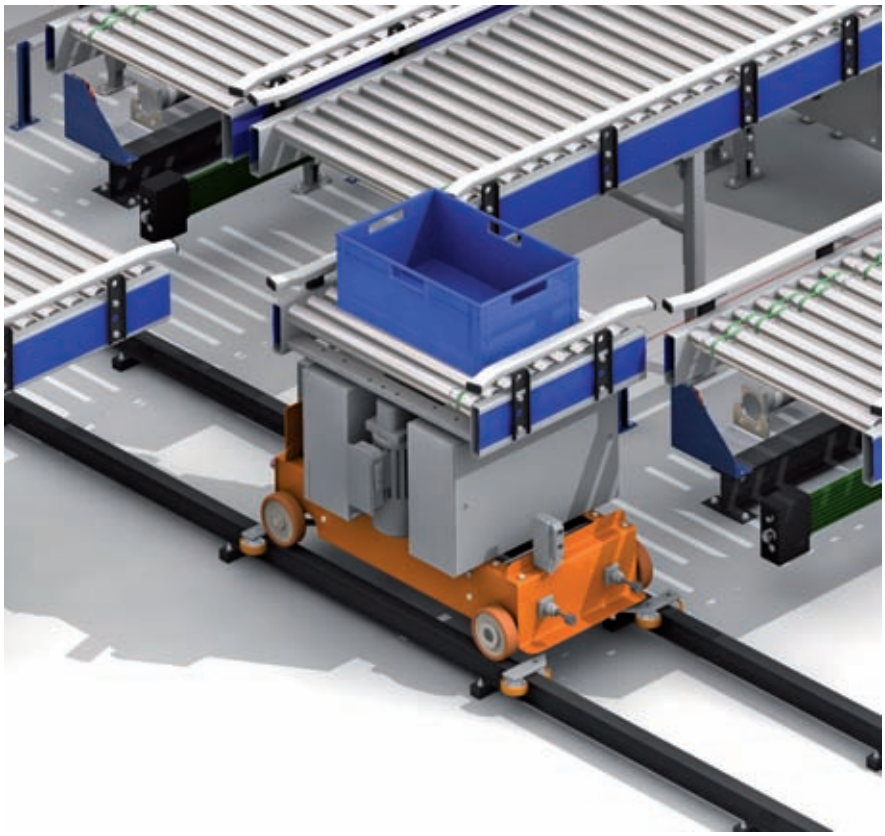


Switch and exit/entrance conveyors

Installations where a large quantity of handled units are moved through the whole system, require building switch conveyors to secondary lines or induction conveyors to high speed lines. These devices are most useful in such situations as they enable changes of direction at high speeds.

TECHNICAL DATA / **Switch and exit/entrance conveyors**

	ROLLERS			BELTS
	Only transport			Only transport
	at 30°	at 45°	at 90°	at 30°
Driving mechanism				
Speed	Max. 1.2 m/s			Max. 2 m/s
Operating system	Drive roller (loop to loop) or flat belt drive			Transmission to the ribbon itself
Type of drive	Asynchronous engine			Asynchronous engine
Mechanical characteristics of the conveyors				
Conveying elements	Roller with metal encasing or coated in plastic			Elastomeric ribbon
Gravity conveyor	±3%			±3%
Height (own structure)	Min. 300 mm - Max. 800 mm			Min. 300 mm - Max. 800 mm
Handled unit				
Length	Min. 400 mm - Max. 800 mm			Max. 1,500 mm
Width	Min. 400 mm - Max. 600 mm			Min. 400 mm - Max. 800 mm
Height	Min. 100 mm - Max. 700 mm			Min. 100 mm - Max. 700 mm
Weight	Max. 100 kg			Max. 100 kg
Working conditions				
Temperature	-30 °C to +40 °C			0 °C to +40 °C



Shuttle cars

This non-continuous system for delivering handled units to different reception stations can form an important part of an operational environment which needs multiple resources. Another benefit is a quick return on investment without having to forsake orderly and profitable operations.

These devices provide a great deal of flexibility in reception and dispatch work.



Lifts stations

Lifts stations are useful in cases where there are limitations in terms of the design of the floor or the transit areas. Lifts can also make these areas more profitable. In such cases a range of lifts is available which are capable of distributing the handled units to different levels, continuously or non-continuously, without affecting operations in the installation.

These devices enable the loads to be recirculated around new levels in height.





P&D stations

These are positions in which the operators interact with the automated system. The goods inside the automated warehouse are handled from here.

Their ergonomic design guarantees quality in load handling and a safe working environment.

Safety is ensured by the different equipment in the stations, minimizing labour hazards for the operator who is working in the P&D stations.

Special systems

Within the range of products offered by Mecalux, systems are available which provide solutions for special situations and projects with major levels of operational capacity.

These devices include:

- Box sorters
- Stackers
- Vertical warehouses
- Carrousels
- Plastic box folders

Mecalux integrates these products into complex logistics systems for boxes, according to the requirements of each installation.



Designed and developed by Mecalux, the systems for moving light loads are particularly suitable for responding to the demands of the market, offering a quality product with low maintenance needs. They are built with standard electrical and mechanical components, which guarantee the reliability and supply of spare parts.



TECHNICAL CHARACTERISTICS

Driving system of the conveyor

Speed

Depending on the characteristics of the handled unit, different speeds are studied for the drive movement.
The speed is directly related to the operational capacity of the origin and destination points.

Operation power

The factors which determine the operation power of the elements that make up a conveyor system are the weight of the handled unit along with the different features included in the installation. Mecalux offers a wide range of options for driving mecanism which provide solutions for all the jobs needed to ensure that the installation works correctly.

Drive roller

The roller has a motor fitted internally and is mechanically connected by means of elastomeric belts to a group of rollers which turn in time with the motorised roller.

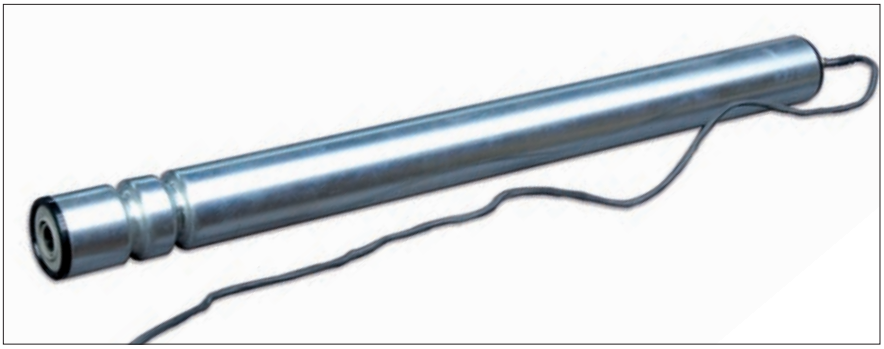
Transmission system

The operation devices are chosen according to the nature of the load unit and the operation method of the conveyor system. The systems can be:

- Drive roller
- Metal drive chain
- Toothed belts
- Conveyor belt
- Drive shaft and chain

Driving rollers

Top-quality driven roller accepts a wide range of speeds and loads.



Drive roller.



Driving metal chains

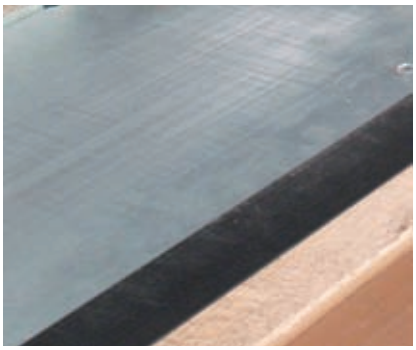
The movement of the rollers is activated by a metal chain-pinion system built onto one side of the conveyor chassis.



Toothed belts

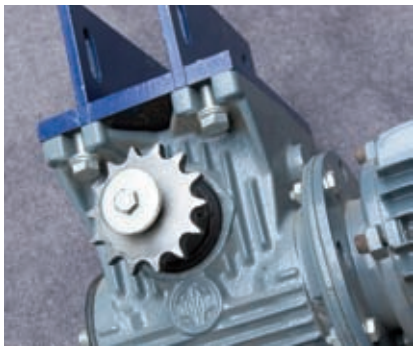
High-resistant long-lasting toothed belts are implemented on mixed transfers with crosswise movements or rollers for the boxes. These are composed of highly adherent materials on the face coming in contact with the load, while the interior face has great flexibility.





Conveyor belt

The load units move along as the elastomeric belt turns. The boxes are carried along by the conveyor belt without any friction between the box and the conveyor system.



Drive shaft and chain

The turning movement is transmitted to a pair of chains through the operating of the motor and a shaft with two cogs, which are connected to the conveyor chain.

Type of drive

A number of different types of drive are commonly used in light conveyor systems. Asynchronous engines are a good option for standardization and have a proven track record with drive.

The climatic and working conditions also determine the selection of the most suitable form of drive.

Mecalux's continuous conveyor systems are designed by selecting the most suitable components for each application. This principle is one of the design priorities in order to achieve the desired quality level.

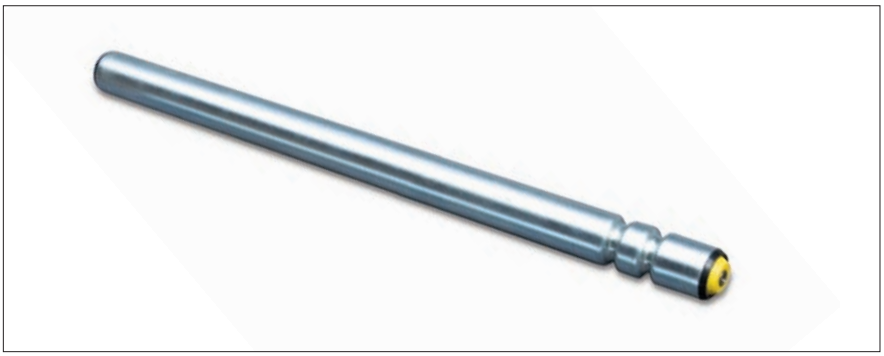
Conveying elements

Depending on the nature of the box to be transported and the role of the functional unit, different conveying elements can be used for the same conveyor system.

The most common components include:

Roller with metal casing

As a standard conveying element, the metal casing of the roller cylinder gives it the adherence needed to move handled units in most situations.



Roller with metal casing.



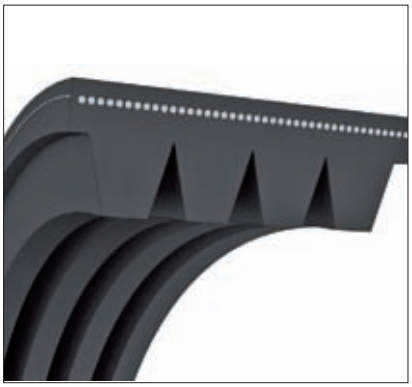
Roller coated in anti-slip material

This system is used when adherence between the load unit and the roller is required, thus preventing the load unit from slipping.



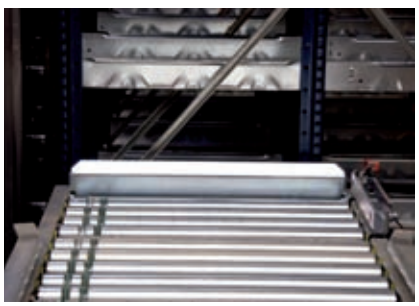
O-rings

They are designed to transmit the movement between rollers. Their use facilitates conveying along long sections of rollers without the need for chains, thus avoiding the need for lubrication and frequent maintenance.



Poly-V Belts (poly-vinyl)

Poly-vinyl belts are an alternative to O-ring belts when having to carry loads heavier than 50 kg, as this type offers better traction over the rollers.





Morphology of conveyor systems

Gravity conveyor

The gravity conveyor is the incline along which the load is transported.

Height

All conveyors have their own support structure which allows them to be height-adjustable and ergonomically indicated to make operator interaction comfortable and to overcome changes in the transport levels between floors.

Length

Maximum distances can be covered with a single conveyor using the same driving mechanism unit.

Width

The width is directly related to the size of the handled unit.

Elastomeric belts

Universal system used for handled units with uneven bases or which are incompatible with any other conveyor system.



High-adherence elastomeric belt

When the transport unit is used to overcome slopes or at high speeds and the transportability must be guaranteed, a belt with a bumpy or adherent material is used.



Elastomeric belt for easy sliding

In order to make changes in direction with certain types of elements, the handled unit must slide on its base, and so a surface which facilitates this task is required. The solution is a belt made from a highly-resistant material which allows easy sliding.

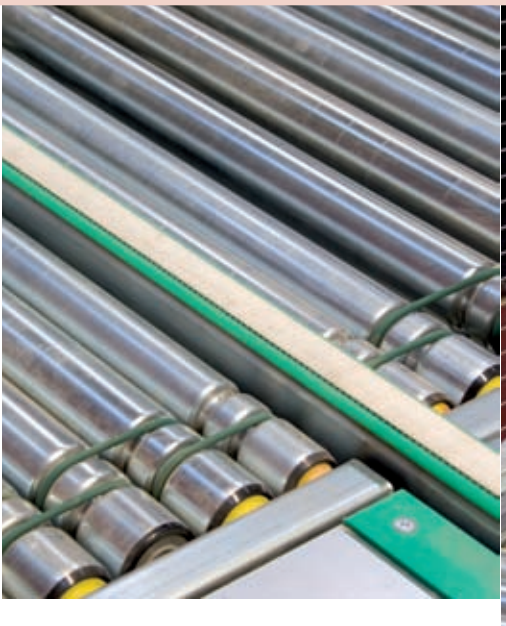


There exists the possibility of building different heights according to needs.

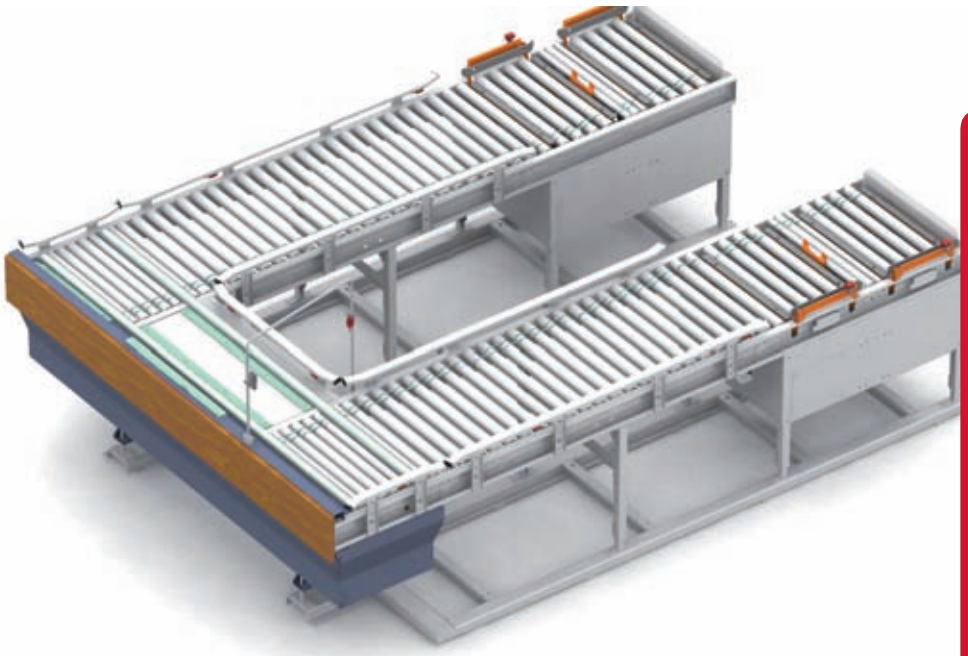

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The distances within an installation can be covered by means of different devices included within the family of products discussed here.

Mecalux offers a standard solution for conveyor which covers all the possibilities arising in typical working environments.

The use of driving mechanism and presence-detection systems by means of mechanical or optical detection devices enables the boxes to be moved under controlled conditions to the desired positions.

All the parts which make up these conveyors are seamlessly integrated with the rest of elements of the installation for the conveyance of light loads within the warehouse.In many cases, they are also built with intelligent systems fitted inside them.

HANDLED UNIT

In automated conveyor systems, the container or handled unit plays a vital role in guaranteeing the proper functioning and performance of the installation.

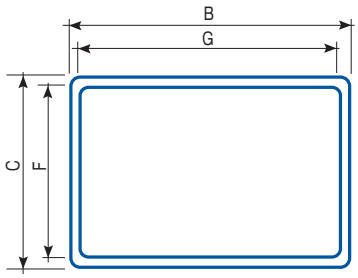


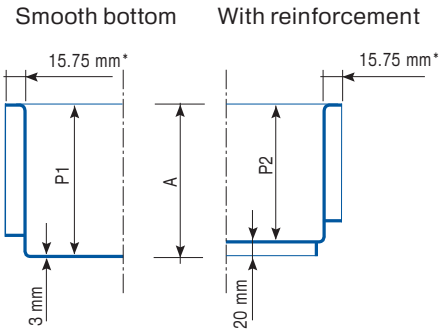
Handled unit

Plastic containers (boxes) are often used as handled units. To a lesser extent, metal containers are also used. In certain circumstances, the goods are conveyed by trays (metal or plastic) which replace the typical container. If the goods are packaged, either definitively or temporarily, in a sufficiently strong cardboard box, this can be used as the handled unit.

The handled unit must meet a series of characteristics which permits it to be handled in automated working environments. Among these characteristics, the following should be noted:

- The contact surface of the base with the conveyor must be flat and stable with sufficient thickness to guarantee a maximum deformation due to deflection of 6 mm.
- The area for the barcode has to be at least 80 mm above the base of the handled unit.
- The function of the photocells must be guaranteed. The light beam must not go through the box. The use of transparent containers or containers with thin mesh can cause detection problems.
- If stacked units are being transported, ensure that they keep the same shape and form when accelerating, decelerating and changing direction.





* In the whole perimeter







- If possible, the units should not have holes in the base nor in the first 50 mm of the sides in order to minimise damage to the belts from leakage.
- The plastic deformation of the base in the rack must be no more than 5 mm and the elastic deformation no more than 10 mm.
- External maximum tolerance +/- 2 mm.
- The foldable boxes should preferentially be built with single hinges as they are sturdier and more stable.

The general table for each system indicates the sizes and weight of the load unit transported.

With the aim of improving the reliability of the conveyor systems for boxes and reducing the problem of certain container types, Mecalux has developed its own range of plastic boxes. The boxes have been designed in accordance with the Eurobox regulations and comply with the mechanical requirements for their intensive use in the conveyor and Mecalux storage systems.The models available are shown in the table below.

Working conditions

Temperature

This is the range of temperatures between which the standard material handling systems can be operated. The conveyor components of Mecalux are designed to work between -30 °C and +40 °C.

Humidity

The relative humidity in the working environment can lead to the need for additional systems of mechanical and electrical protection in the installation. For instance, the transfer of handled units may require lower handling speeds, in addition to other specially protected devices.

TECHNICAL DATA / **Mecalux Euroboxes**

Model		Height	Width	Length	G	F	P1	P2
CME	640 x 420	420	600	400	568.5	368.5	417	–
	640 x 320	320	600	400	568.5	368.5	317	–
	640 x 240	240	600	400	568.5	368.5	237	–
	640 x 170	170	600	400	568.5	368.5	167	–
	640 x 120	120	600	400	568.5	368.5	117	–
CME reinforced	640 x 420	420	600	400	568.5	368.5	–	400
	640 x 320	320	600	400	568.5	368.5	–	300
	640 x 240	240	600	400	568.5	368.5	–	220
	640 x 170	170	600	400	568.5	368.5	–	150
	640 x 120	120	600	400	568.5	368.5	–	100

Measurements in mm

MECALUX

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