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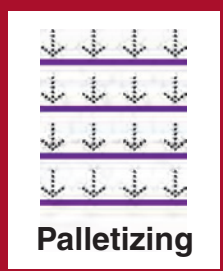
# Palletizing Systems




Standard for economy
and reliability
in palletizing technology

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**Filling, palletizing, packaging, loading.**
**The entire process from a single source . . .**


When palletizing, economy and reliability set the standard. For this reason investments in top quality are not a luxury:

# Palletizing plants from Möllers

Over half a century of intensive development and application knowledge gathered from around the globe – Möllers palletizers are a synthesis of experience and technology as they currently stand

## Investment decisions on solid ground

Top quality palletizing machines must process large volumes of packaging goods at high speed whilst treating sensitive goods with the utmost care and form exactly formed, stable pallet loads. Top quality palletizing machinery can be recognized by its suitability to the most varied packaged goods' characteristics and operational conditions. They are adaptable to various packaged goods and pallet formats and integrate seamlessly in automatic work processes. Palletizing machinery of top quality operates in an energy-saving manner and at a low noise level and fulfil their task at highest availability – hour after hour, year after year.

Möllers palletizing machinery represents top quality products and the result of a development with which Möllers has coined the required standard over a period of more than 55 years. Möllers palletizing and packing plants set the standard for reliability and put investment decisions on solid ground.

## Top quality has its roots

Important advances in palletizing technology machinery had their origins at Möllers, others were perfected by Möllers engineers. The slit slide plate, the extremely shallow and the aerated slide plate are such examples just like the tiered layer forming, the drive technology which is gentle on packaged goods and the fully automated filling, palletizing and packaging processes.

# PLS, PFS, PGS & Co. – in detail and better overall:

Möllers palletizers are tailored in every detail and in the sum of its capabilities to the multitude of demands in practice

### Plant-Engineering: Planned safety

At the outset meticulous design, thereafter the overall supply and the installation, to hand-over – that is Möllers-Plant-Engineering, basis of perfect plant function. With application experience in numerous sectors we secure the long-lasting success of packaging investments.

### Packaged goods types: Palletize what is stackable

Möllers palletizing machinery processes stackable packaged goods of all types – from bags to carton packs, crates, cans, tins and pails to barrels. Specialised in packaged goods susceptible to deformation, Möllers palletizers are characterized by extremely gentle handling methods and their suitability to all types of bagged goods.

### Palletizer performance: Extreme spectrum

Möllers meets the capacity demands in practice head on with a palletizer range which satisfies the demands of practically all industrial sectors with throughput rates of under 100 to over 4500 packs per hour.

### Options: High adaptability

Thanks to their modular design, Möllers palletizing machines can be flexibly adapted to their field of application. With a wide choice of basic and complementary modules, the machines are extendable to special package format characteristics, to packaged goods preparation and to additional functions.

### Robots: To palletize with savvy

Möllers palletizing and depalletizing robots are true masters of intelligent palletizing, with mixed packed goods formats and sorting functions.

### Palletless dispatch units: Maximum efficiency

With the Möllers reverse-hood shrink system packaged goods become self-supporting, stable and hermetically sealed dispatch units without any load support – often the most economic form of bundling dispatch goods and very environmentally-friendly to boot.

### The model series: Need-based choice

With the model series PLS-B, PLS-C, PGS, PFS and special designs for, among others, large capacity packaging, the Möllers palletizer range covers all needs optimally.

Stacked on Möllers palletizers and packed on Möllers shrink hood wrapping machines:The palletless shrinkwrapped package with its multiple benefits is a particularly economic dispatch unit

Palletizing robots master programmed palletizing of packaged goods of various sizes and can sort various packaged goods by certain qualities onto several pallets

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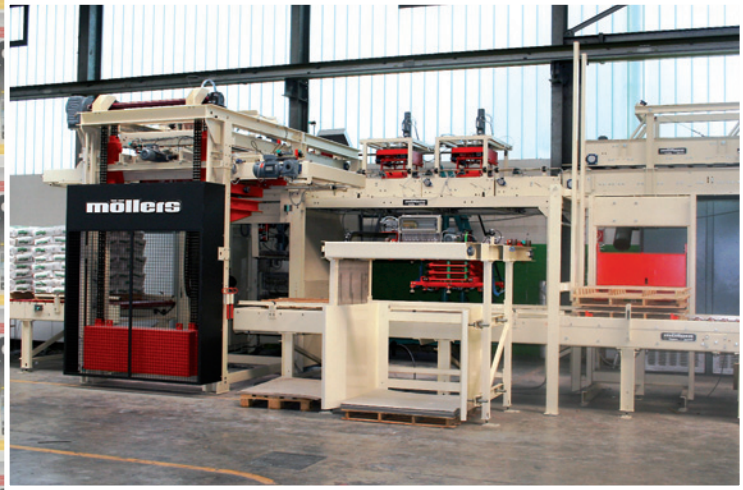
Basis of perfectly tailored packaging plants:

# Palletizers with modular design



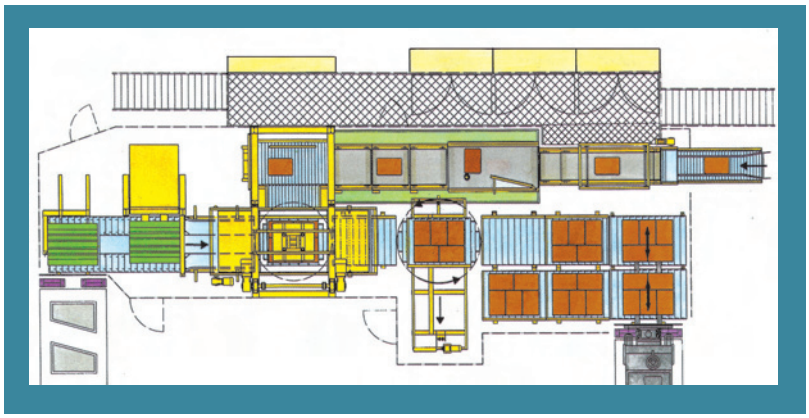

PLS palletizers in a dispatch terminal

Layer formation on the PLS palletizer. To the right bags on the infeed belt, to the left ready bag layer on the slide plate

Möllers palletizing machines are manufactured using modular design. This principle is the basis of perfect adaptability of the machines to the required throughput rates, to the type and to particular characteristics of the goods to be palletized and to operational fields of use. The high degree of extendability is at the same time one of the foundations for the erection of customer-oriented, complete packaging installations – from product filling to transport-secure packed dispatch units – which Möllers is synonymous with as a worldwide recognized specialist.

## Three standard model ranges

The Möllers range comprises three standard model ranges as well as special palletizers. The type PLS machines and optionally, the PFS machines, are tailored as a slide plate palletizer with the split slide plate. The PGS model range palletizing machines operate using the loading fork as a positioning device. PLS-palletizing machines are available as the C model range with throughput rates from 1200 to 3000 bags per hour, B model range palletizers with capacities of 1200 to over 4500 bags per hour are tailored to even higher capacity requirements.



Layout of a high-capacity palletizing installation with twin-pallet discharge

. . . with all components: In-line packers, 2 to 6 filling spouts

Gentle, shock-free formation and layer transfer:

# Stable pallet loads are formed in this manner

Möllers palletizing machines take care of the great susceptiblity to deforming of many packed goods thanks to their special method of operation. Buckling, tears and bulges must also be avoided at high operating speeds, so that exactly stacked, stable pallet loads are created. Significant components for this, in tailored combinations:

- **Bag flattening in bag flattening stations**
  for bag shape optimisation prior to palletizing
- **Optionally available bag turning devices**
  Turning posts, side flap rotator, lifting grate rotator
- **Low pressure formation**
  of bag layers by means of controlled run-in tracks
- **Slit, surface-optimised slide plate**
  for halved slide distance and reduced friction coefficient
- **Aerated slide plate and intermediate platform**
  for maximum reduction in slide resistance
- **Super-shallow slide plate**
  and precisely controlled pallet lift drive, for lowest flexing deformation of the bags when put down on the pallet
- **Frequency- and servo-controlled drives**
  to avoid jerks on start-up and braking
- **Post flattening with pressure-plate**
  to optimise layering for the subsequent layer of bags

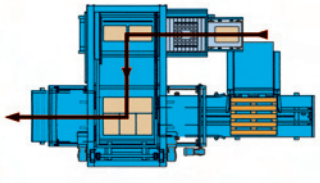
**Optionally employable turning devices:**


Turning post, employed for among others, cement bags

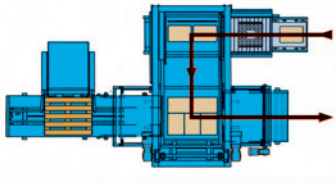
Flattening side flap rotator for soft bags

Lifting grate rotator for extremely limp bags

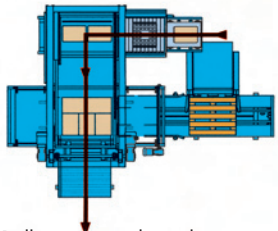
**Optional run-in/run-out arrangement depending on installation situation**



Bags and empty pallet feed from the right, optionally from the left, pallet discharge to the left, optionally to the right

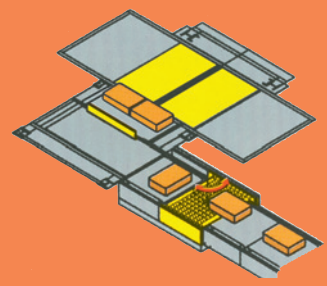


Bags feed from the right, pallet discharge to the right, optionally from/to the left, empty pallets from the left, optionally from the right

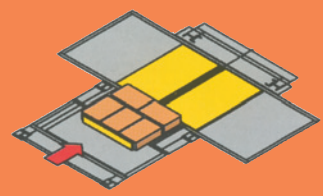


Palletised goods and empty pallet feed from the right, optionally from the left, pallet discharge to the front

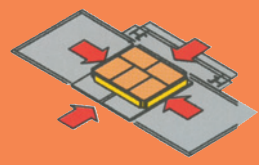
**Layer formation Example: 5-bag-layer**



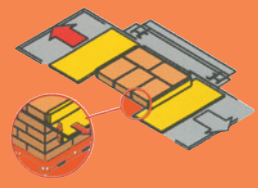
Bags of the 1st layer line run in lengthways and are transferred by the layer transfer unit onto the intermediate platform. Bags running in for the 2nd line are turned 90° by the lifting grate rotator



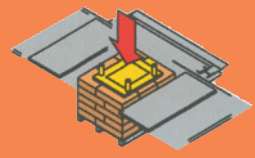
The 2nd line is completed by the layer transfer unit with the 1st line and transferred onto the split slide plate



The layer is brought to layer size by calibrating bars and positioned exactly above the pallet



The layer is placed on the pallet by opening the centrally slit slide plate



Post flattening of each deposited layer by the layer pressure plate

# PLS-C – The chemical palletizers . . .

Large capacity packaging plant
with six PLS-C palletizers in a polyolefin works

## In the right format at a mouse click

In the bulk material-producing industrial sectors the most various bag formats are used from which various packing patterns result. The typical module design of Möllers palletizers makes variable tailoring of the machines to predetermined packed-goods formats and pallet sizes possible. The most frequent bag lengths lie between 400 and 1100 mm, usual bag widths between 275 and 550 mm. The selection from the stored bag formats in the program and the ancillary layer patterns, as well as possibly assigned pallet sizes, takes place on these palletizers at the touch of a button or a mouse click, all machine settings are correspondingly automatically activated if desired.

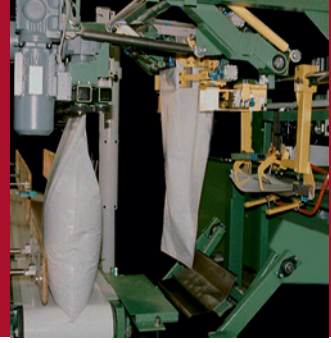
## Layer pattern options as required

| Bond | 2-bag | 3-bag | 4-bag | chimney | 5-bag | 6-bag | 6-bag |
|---|---|---|---|---|---|---|---|
| Layer pattern |  |  |  |  |  |  |  |
| Bag length [mm] | 1100 | 800 | 600 | 650 | 650 | 600 | 600 |
| Bag width [mm] | 550 | 400 | 400 | 450 | 450 | 300 | 300 |
| Recommended pallet B | 1100 | 800 | 800 | 1100 | 1100 | 800/1000 | 800/1000 |
| dimensions [mm] L | 1100 | 1200 | 1200 | 1100 | 1300 | 1200 | 1200 |

| Bond | 6-bag | 7-bag | 7-bag | 8-bag | 8-bag | 8-bag | 10-bag |
|---|---|---|---|---|---|---|---|
| Layer pattern |  |  |  |  |  |  |  |
| Bag length [mm] | 600 | 400 | 500 | 450 | 450 | 550 | 400 |
| Bag width [mm] | 400 | 300 | 330 | 300 | 300 | 275 | 300 |
| Recommended pallet B | 1200 | 800 | 1000 | 800/1000 | 1000 | 1100 | 1000 |
| dimensions [mm] L | 1200 | 1200 | 1200 | 1200 | 1200 | 1100 | 1200 |

## Throughput rates (bags/h)

| Bond | 5-bag | 4-bag | chimney | 6-bag | 6-bag | 7-bag | 8-bag |
|---|---|---|---|---|---|---|---|
| Layer pattern |  |  |  |  |  |  |  |
| PLS-C 1200 | 1200 | 1000 | 900 | 1400 | 1350 | 1400 | 1450 |
| PLS-C 1600 | 1600 | 1350 | 1250 | 1800 | 1600 | 1800 | 1850 |
| PLS-C 2000 | 2000 | 1650 | 1500 | 2300 | 2000 | 2300 | 2350 |
| PLS-C 2400 | 2400 | 1950 | 1750 | 2750 | 2600 | 2750 | 2800 |
| PLS-C 3000 | 3000 | 2400 | 2200 | 3000 | 2800 | 3000 | 3000 |

. . . with all components:

**FFS bag filling machines, Pneumatic packers,
Vacuum packers, Screw packers
Dump weighers, Open-mouth bag filling lines**

# to measure: PLS-C 1200, 1600, 2000, 2400, 3000

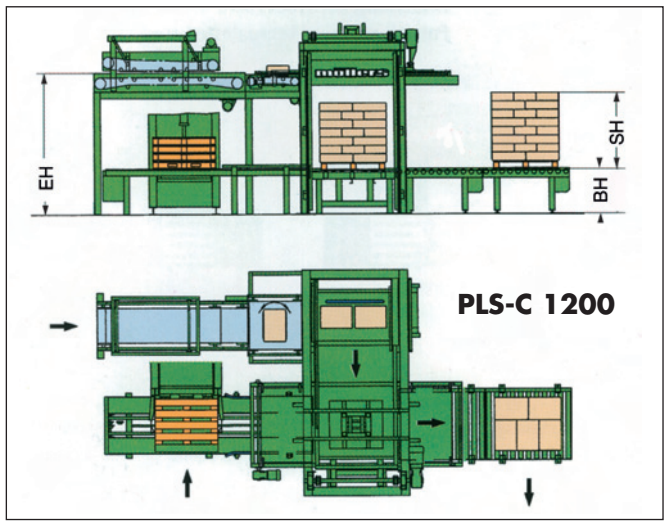
The PLS-C model series designated as chemical palletizers correspond, with their capacities of 1200, 1600, 2000, 2400 and 3000 bags per hour, to filling capacities as they are characteristic for the chemical basic material industry, the plastics producing petrochemical facilities and the fertiliser industry.

## Sliding plates with regulated air pressure

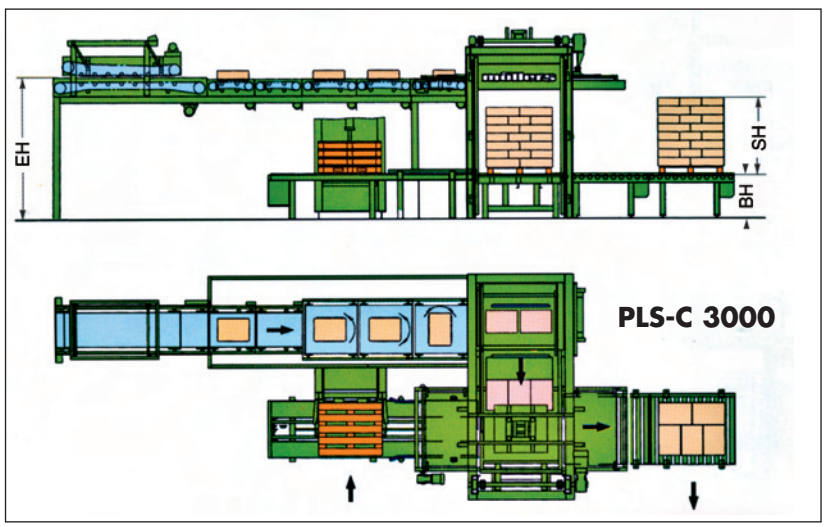
Typical for chemical products is the plastic bag. Consequently an equipment standard established itself for chemical palletizers, which almost always comprises the side flap rotator or lifting grate rotator and anti-friction coated or aerated slide plates as well as frequency controlled, impact-free drives. Owing to the ambient conditions, the product and bag characteristics as well as depending on the bag filling degree, aerated slide plates can be equipped with regulated aeration systems in order to optimally set the slide plate to the sliding behaviour of the bags.

For forming-up the bags the machines have one or two spacer conveyors depending on throughput capacity. Depending on capacity and packing patterns, one to three rotation devices can be installed. The tables show the connection between selected packing pattern and effectively achieveable bag throughput.


Corrosion-protected PLS-C palletizer
in a packaging line for evaporated salt




| Stack height SH [mm] | Infeed height EH [mm] |
|---|---|
| 1500 | 2500 |
| 1600 | 2600 |
| 1800 | 2800 |
| 2000 | 3000 |
| 2200 | 3200 |
| Conveyor BH = 700 mm | |




# PLS-B – The high-speed palletizers . . .

## Favourites of the building materials industry


Cement works are a domain of the high-capacity PLS-B palletizers

With throughput rates of 1200 up to maximum 3000, 4000 and 4500 bags per hour, depending on the layer pattern employed, the model range PLS-B palletizing machines fulfil the requirements of the building material producers. Tailored to the relatively rigidly-formed kraft paper valve bags used in these industries, the B-series Möllers palletizers are often equipped with turning posts to turn the bags in a transverse position. Turning posts restrain the bags approaching on the conveyor belt eccentrically, the torque thus created effects the 90°- turn.

### Double lower layer feeder

The machines palletize bags of all common formats and weights in the four to ten bag layer pattern. The high-capacity palletizers

### Layer pattern options and throughput rates (bags/h)

| Bond | 5-bag | 8-bag | 4-bag | chimney | 6-bag | 7-bag | 6-bag | 7-bag | 8-bag | 8-bag | 10-bag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Layer pattern |  |  |  |  |  |  |  |  |  |  |  |
| PLS-B 1200 | 1200 | 1450 | 1100 | 1000 | 1250 | 1500 | 1200 | 1450 | 1550 | 1300 | 1800 |
| PLS-B 2000 | 2000 | 2400 | 1850 | 1700 | 2100 | 2500 | 2000 | 2400 | 2600 | 2200 | 3000 |
| PLS-B 2400 | 2400 | 3000 | 1900 | 2000 | 2600 | 3250 | 2800 | 2900 | 3300 | 2950 | 3600 |

| Bond | 5-bag | 8-bag | 4-bag | chimney | 6-bag | 7-bag | 6-bag | 7-bag | 8-bag | 8-bag | 10-bag |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Layer pattern |  |  |  |  |  |  |  |  |  |  |  |
| PLS-B 3000 | 3000 | 3400 | 2400 | 2200 | 3000 | 3000 | 2800 | 3000 | 3600 | 3150 | 4000 |
| PLS-B 4500 | 3200 | 4500 | 2500 | 2500 | 3400 | 4000 | 3400 | 3600 | 4200 | 3800 | 4500 |

| Bond | 5-bag | 2-bag | 3-bag | 4-bag | chimn. | 6-bag | 6-bag | 6-bag | 7-bag | 7-bag | 8-bag | 8-bag | 8-bag | 10-bag |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Layer pattern |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PLS-B Universal | 1400 | 700 | 1200 | 1600 | 1400 | 1400 | 1350 | 1400 | 1400 | 1400 | 1350 | 1600 | 1400 | 1400 |


# PLS-B 1200, PLS-B 2000
# PLS-B 2400, PLS-B 3000
# PLS-B 4500
# PLS-B Universal

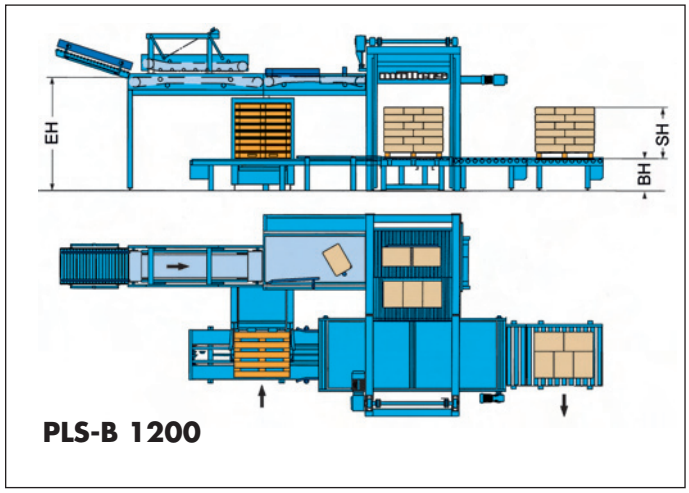
from the B-series are equipped with spacer conveyors. The employment of an installed double lower layer feeder for gentle transfer of the bag layers onto the slide plate serves not only the safety of the large palletizer capacity but also the greatest possible care for the bags.

### Universal-type for limp bags

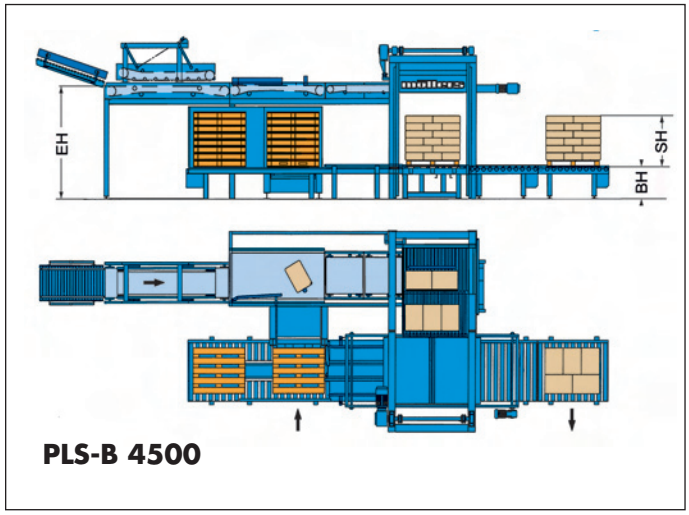
Building materials and building additives, apart from being filled in firm valve bags, are also filled in less sturdy bags such as plastic valve bags or open bags. For factories with such packed goods the PLS-B Universal type palletizer is ideal. It can also be fitted with a side flap rotator or the lifting grate rotator and be designed for a broad range of varying layer patterns.

| Stack height SH [mm] | Infeed height EH [mm] |
|---|---|
| 1500 | 2500 |
| 1600 | 2600 |
| 1800 | 2800 |
| 2000 | 3000 |
| 2200 | 3200 |
| Conveyor BH = 700 mm | |

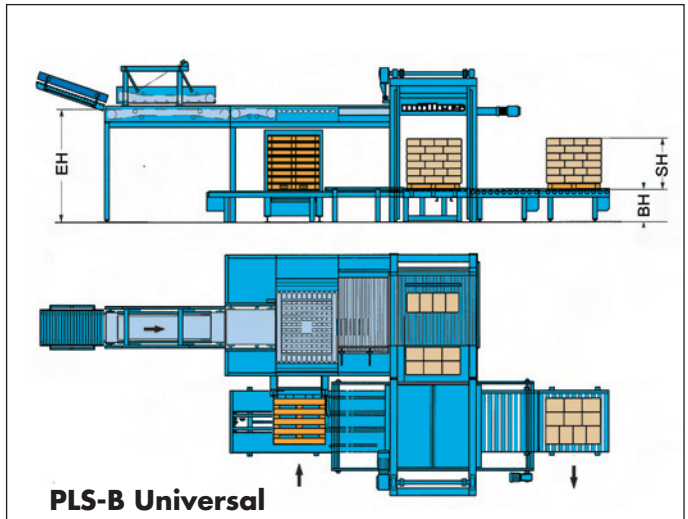
Exactly formed pallet loads stacked four-fold




PLS-B 1200




PLS-B 4500




PLS-B Universal

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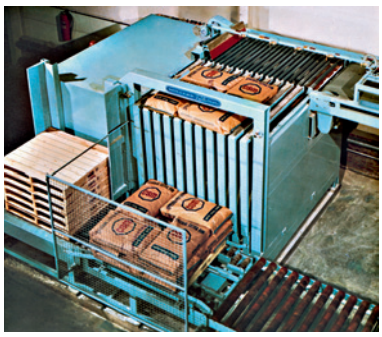
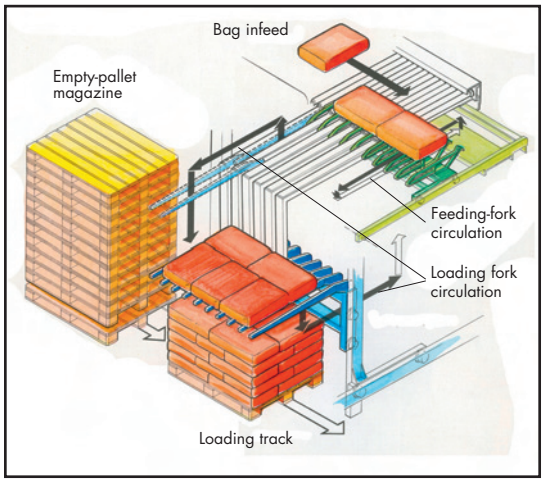
Alternative in the medium segment:

# PGS, the universal fork palletizer

For many packed goods, the fork palletizer is a sensible alternative to the slide plate palletizing machines



Palletizing in the chimney-type bag pattern on a PGS type palletizer




Lift – Move – Lower – Reverse. With these circular movements the feeding fork and loading fork gently bring the products onto the pallet

Built for decades and valued by many operators as a machine with decades-long experience of high availability, the PGS palletizing machine, in its current version, corresponding to the latest state-of-the-art, offers an important alternative to the slide plate palletizers. The lines of bags formed on the infeed conveyor are line after line forwarded by means of a feeding fork on an loading platform. When the layer is completed on the platform it is lifted by a loading fork, transported beyond the edge of the platform and lowered onto the pallet. On reversing under the loading platform, the fork takes off the layer onto the pallet.

PGF-Palletizers are suited to medium capacity requirements of between 800 and 2400 bags per hour for packed goods of adequate form-rigidity, e.g. building material bags and paperboard containers and can, under correspondingly economic circumstances, be the optimal choice.

## Palletizing in special cases

Möllers palletizers are available for almost all packed goods which can be piled up into free-standing stacks. Apart from the PLS- and PGS-palletizing machines as well as the PFS-palletizers, special palletizers are part of the range, which are designed optimally for packed goods with special characteristics, e.g. for large format packagings.

Palletizing at sight height and alternating on several pallets

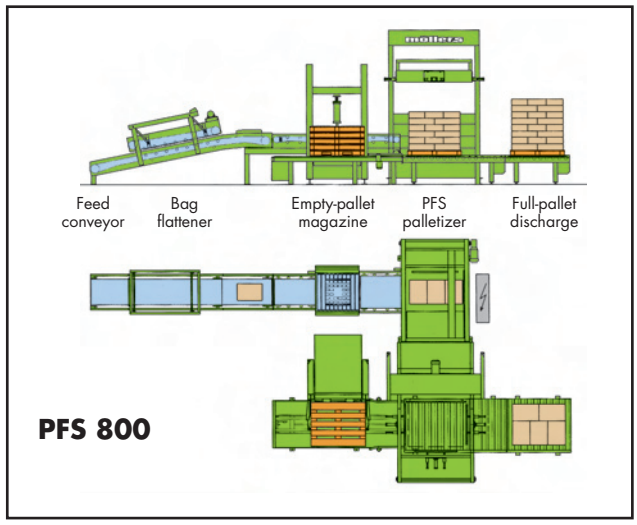
# PFS – Floor Module Palletizer and Multi-Palletizer

Palletizing machines of the PFS model range, apart from the characteristic advantages of all Möllers palletizers offer two special characteristics:1.The low-level design. PFS machines are configured from stand-alone modules which perform the palletizing process close to floor-level and at a height offering a good overall view. 2. The variable capacity spectrum. With their typical throughput rates, the PFS palletizers make machine palletizing also accessible to companies with smaller packed goods volumes and thanks to the exchangeability and retrofitability of the floor modules, they can grow with it when capacity requirements increase. PFS palletizers are particularly well suitable for extending with additional devices and like the other Möllers palletizers they can be flexibly adapted to the available space at the erection site.

**PFS standard throughputs**

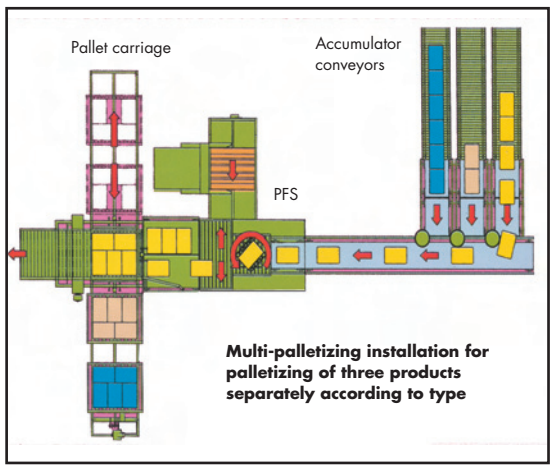
| | |
|---|---|
| PFS 500 | up to 500 bags/h |
| PFS 800 | up to 800 bags/h |
| PFS 1200 | up to 1200 bags/h |

PFS palletizing installation in a gas carbon black works




## Pallet changing by layers

PFS machines extended to multi-palletizers make palletising of several packed goods possible alternating between several pallets. Multi-palletizers consist of standard modules as well as a special module, designed as a pallet-changing carriage which brings the pallets just to be loaded into the loading position. The goods to be palletized are collected according to type on accumulator conveyors and called up for palletizing by the layer.




Multi-palletizers with three pallet positions

PFS special palletizer for large cartons

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They are the Formula 1 in adaptability and versatility:

# Palletizing and depalletizing robots

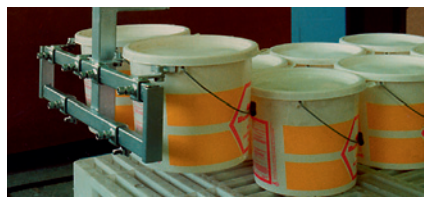

Bag palletizer station with Möllers ROMEO® robot and Möllers special bag combi-gripper which also places card-inlays onto the pallets

Palletizing robots are an important alternative to traditional palletizing machines. Piece by piece they put together the stack directly on the pallet; their work procedures are fixed in a program form. The number of storable and instructable package formats and layer patterns is as a result almost limitless. Besides, robots can take on tasks which go beyond the immediate palletizing function, such as sorting of packages on several pallets. A further field of application has been found for robots in depalletizing.


Independent of the working conditions, various robot systems are used, such as the Möllers ROMEO®-robot (left) operating on the Scara principle, or hinged-arm robots.

Möllers offers palletizing robots of various types and a wide choice of packed-goods specific grippers. Serving palletizing of difficult bagged goods, the Möllers special bag gripper with its tailored approach gently picks up the bags and can place them close together on the pallet. Möllers Robot Palletizing Systems can easily be programmed and are characterized by high availability.


Gentle pick up and close placing of the bags with the Möllers bag gripper



Two at a single stroke: Capacity increase with the twin bucket hook gripper


Suction grippers are very flexibly extendable load handling attachments – suitable for bags . .

. . . as well as paperboard containers, pails and many other types of packages

# Equipment options and auxiliary devices

To master difficult packing goods. To carry out additional tasks

In the well thought-out range of equipment options, Möllers' decades-long experience with palletizing technology is expressed. Equipment options serve to set up the palletizer for certain palletizing goods and their characteristics and play a significant role, especially for bag palletizing.

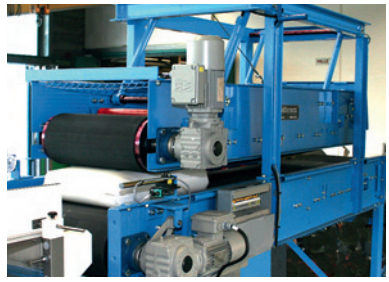
## For stable pallet loads

Bag flattening stations serve to flatten bagged goods which have become deformed during transport and assume a considerable role in creation of exact, stable pallet loads. The same goal is achieved with aerated slide plates and layer pressure plates. Card inlays and film applicators offer loads' undersides protection against soiling and dampness; card inlays and glue applicating devices stabilize loads of particularly unstable bagged goods. Bag checkweighers check filled-bag weights.

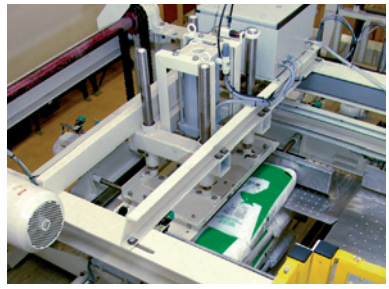
## For safe identification

Inkjet coders and labelling devices are auxiliary devices with whose help the marking and labelling of the packed goods can be incorporated into the palletizing process as an auxiliary function. Metal detectors check the bag contents for metallic contaminants.

Bag flattening station



Layer pressure plate



Inkjet coder

Film applicator

Card inlay applicator

Metal detector

Bag checkweigher

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MACHINES • PLANTS • SYSTEMS

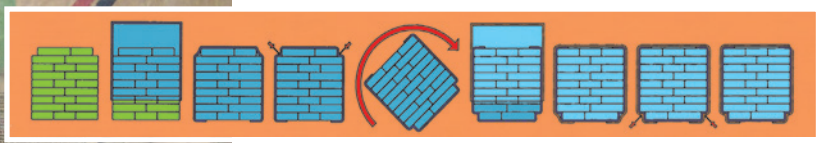
**Filling, palletizing, packaging, loading.**
**The entire process from a single source . . .**


# Palletless reverse hood shrink packages

## Film replaces the expensive pallet – with three-fold use

Only the goods for dispatch and a handful of pollutant-free, recyclable polyolefin film – the reverse hood shrinkwrapped package is a very environmentally friendly form of packaging

High capacity reverse hood shrinkwrapping packaging line



Step sequence for reverse hood shrinkwrapped packaging

With the palletless shrink/stretch packaging according to the Möllers reverse hood shrink system, goods to be dispatched are stacked and then enclosed in two film hoods. One reversely to the other, the hoods are drawn over the load and shrunk. So stable, self supporting dispatch units are built without the use of any load carrying device. Three important advantages distinguish the packages:

1. **All pallet costs disappear**
2. **High transport rigidity**
3. **Absolute water tightness**

The reverse hood shrink cover clamps together the packaged goods stacked on a palletizing machine into a solid load block and encloses it hermetically. Apart from high rigidity, with which they can survive frequent handling and long overseas journeys, the shrinkwrapped packages demonstrate total impermeability to moisture ingress. As a result also packages containing sensitive products can be stored in the open air, handled in all weathers and be transported on open vehicles. Möllers reverse hood shrink wrappers are built in various versions, for throughputs from 25 to 120 packages/h.

Building materials protected in reverse hood shrinkwrapped packages can be stored for months in the open without being damaged

Reverse hood shrinkwrapped packages can be transported on open wagons. Loading and unloading only take minutes

As a rapid and weather-independent stowable load unit, reverse hood shrinkwrapped packages are ideal for ships

# The process control system Producat®

## Central control for efficient packaging processes

Perfectly functioning palletizing and packaging plants with their high degree of automation need a perfect central control and monitoring system which reliably supports observation functions using the minimum of personnel. The computer-based control and visualizing program Producat® developed by Mölllers for this purpose puts all dialogue tools crucial for operational procedures at one's disposal at a central terminal:

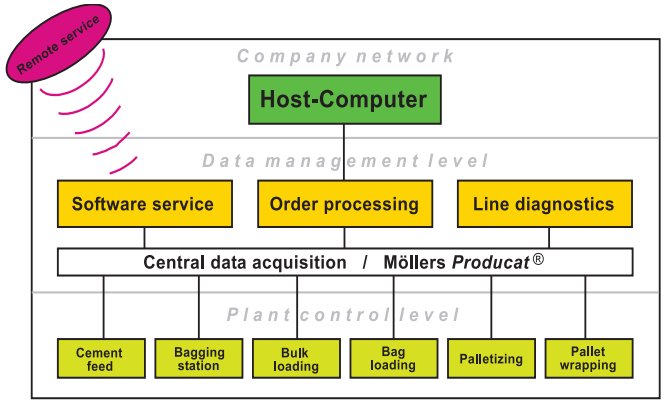
1. **Rapid overview** of the process structure and insight into the process procedure

2. **Simple, obvious operational procedures** easy, error-minimized input of contract data

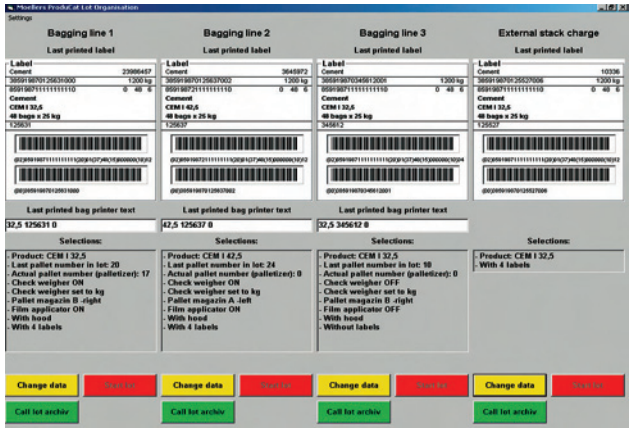
3. **Diagnosis routines available directly** and without delay in case of interruption, optionally with a link to the Möllers Teleservice

Producat® comprises all plant data and prepares it for data management. Graphic representations and table visualizations make understanding of the plant functions and input requirements simpler. Producat® is prepared for connection to higher-level systems (host-computers) as well as system extensions. Thanks to the internet capability of Producat®, other computers linked in with the company network can be used for order processing and plant diagnosis.

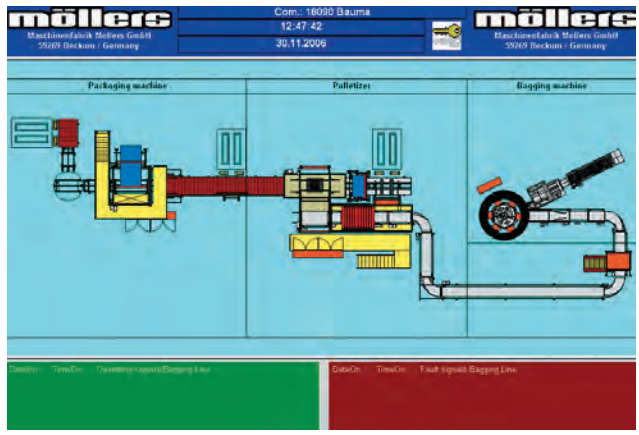
For dialogue, Producat® offers module A) Order Processing, B) Plant Diagnosis and C) Program Care. Module A is the standard for inputting of production orders. Module B serves monitoring of the plant's status as well as localization of errors and elimination of them. The module C is used by IT-specialists for the basic settings of the system and serves, with the use of Möllers Remote Service, online updating of the system software.




Producat® captures the machine data on the control level and prepares it for the data management level




Module Order Processing: Complete product data sets are called off with just a mouse-click, according to which all required machine settings run automatically




In the module Plant Diagnosis, sensors and actuators signalize the plant operation by colored signals which in the case of faults support the localization by blinking or color change

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## Planning, development and manufacture of complete plants

## Everything from a single source


**Filling plants for bulk, liquid and pasty products**


**Shrink film packaging plants**


**Fully automatic truck loading systems**


**Palletizing plants**

**Palletizing and depalletizing robots**


**Palletless shrink/stretch packaging plants**


**Conveyor and loading systems**


**Stretch film packaging plants**


**Bag loading machines**

**Bag loading systems**


**Control and visualization systems**

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**Maschinenfabrik Möllers GmbH · 59269 Beckum/Germany · Sudhoferweg 93-97 • 59247 Beckum/Germany · P.O. Box 17 64**
**Telephone +49 (0)2521 88-0 · Fax +49 (0)2521 88-100 · info@moellers.de · www.moellers.com**

**Manufacturing plants of the Möllers Group:**

**Mollers North America Inc.**
5215 – 52nd St. S.E., Grand Rapids, Michigan 49512 / USA
Telephone +1 (616) 9 42-65 04, Fax +1 616 9 42-88 25
mollersna@mollersna.com, www.mollersna.com

**GREIF-VELOX Maschinenfabrik GmbH / Logdos**
P.O. Box 12 11 51, 23532 Lübeck / Germany
Kronsforder Landstraße 177, 23560 Lübeck / Germany
Telephone +49 (0) 451 53 03-0, Fax +49 (0) 451 53 03-233
webmaster@greif-velox.de, www.greif-velox.de
logdos@logdos.de, www.logdos.de

**Librawerk Maschinenfabrik GmbH**
Vossenkamp 1, 38104 Braunschweig / Germany
Telephone +49 (0) 531 370 98-0, Fax +49 (0) 531 370 98-88
info@librawerk.de, www.librawerk.de

**NATRONAG Maschinenfabrik GmbH**
Vossenkamp 1, 38104 Braunschweig / Germany
Telephone +49 (0) 531 370 98-0, Fax +49 (0) 531 370 98-88
info@natronag.de, www.natronag.de

**Subsidiaries of the Möllers Group:**

**000 "Möllers Intertec",** 129226 Moscow / Russia, ul. Selskohosjastwennaja, dom 17
Hotel "Tourist", kor. 4, office 317
Telephone/Fax +7 495 187 40 27, moellers@tgcom.ru

**Möllers Singapore,** Singapore Representative Office, # 10 – 09 Golden Mile Tower
6001, Beach Road, Singapore 199 589 / Singapore
Telephone +65 6 298 9860/9817 6880, Fax +65 6 298 9289
moellers@singnet.com.sg

**Möllers France,** 14, rue de la Papeterie
67310 Wasselonne / France
Telephone +33 6 32 98 24 52, Fax +33 3 88 87 29 00, moellers-france@orange.fr

**Möllers (UK) Ltd.,** Maxron House, Green Lane, Romiley, Stockport
Cheshire SK6 3JQ / Great Britain
Telephone +44 161 406 9824, Fax +44 161 494 5982, info@moellers.co.uk

**Möllers Prag,** Nad Rokoskou 14,18200 Praha 8 / Czech Republic
Telephone +420 2 8468 2462, Fax +420 2 8468 0499, bartosm@czn.cz

**Möllers Brasilien,** Via Anhanguera km 14,5 - Vila Mangalot,
05000 São Paulo / Brazil

02.2008/1.5 E/Ry/Stu