



# BALING TECHNOLOGY

AUTEFA Solutions leads the way









# AUTEFA Solutions leads the way

AUTEFA Solutions is a global market leader for automatic bale presses and packing systems for staple fiber and tow.

AUTEFA Solutions offers the entire range from fiber transport to the baling press, as well as bale transport and storage of the finally pressed, wrapped and strapped bales in bale warehouses. Today, a fully automated baling process with bale transport directly to the warehouse has become utmost essential, as due to the growing capacities of fiber lines, manual packing of bales would be impossible without massive use of labour and space. Highest efficiency of fiber production is only granted by consequent automation of a fiber line. Our system consists of single modules that can be combined – based on the specific project requirements – to achieve complete and optimal solutions. Permanent development and innovation of tried and tested modules guarantee a state-of-the-art technical standard and a high availability.

## THE CONTINUOUSLY AUTOMATED BALING SYSTEM PROVIDES MANY ADVANTAGES:

- Very economical due to reduction of operation and production costs
- High availability – up to 99 %
- Central control of the entire installation
- Complete solution from one supplier
- Step-by-step automation is possible due to the modular design

### EXCERPT OF REFERENCES

- Aksa
- American Synthetics Fibers
- Amoco
- Birla Group
- Chemtex International Inc.
- China Texmatex Trading
- China Textile Academy
- Chiyoda Corp.
- Cydsa
- Dralon
- Dupont
- Eastman
- EMS Inventa-Fischer
- EMS-Chemie
- Enka
- Far Eastern Textile
- Fiber Visions
- Fleissner
- Fujian Billion Group
- Funing Aoyang
- Greenfiber International
- Hualon
- Hubei Golden Ring Green Fiber
- Huvis
- Hyosyung
- IBN Rushd Polyester Plant
- Ibrahim Fibers
- Indo-Bharat
- Indorama
- Jiangsu Jiangnan High Polymer
- Jiangsu Sanfangxiang Group
- Kohap
- Kolon
- Kosa
- Lenzing
- Liaoyang Petrochemical Fiber
- Lurgi
- Mitsubishi Rayon
- Mogilev
- Monsanto
- Montefibre
- Nanya Plastics
- Noy Vallesina Engineering
- Oerlikon Neumag Textile
- Reliance
- Rhodia
- S.T.P.C.
- Saehan
- SASA Polyester
- Sateri Fiber
- Shandong Yamei Sci-Tech
- Shanli Chemical Fiber
- Silon
- Sojitz Machinery Corporation
- South Pacific Viscose
- SPC Jinshan
- SRK Engineering GmbH
- Sudamericana de Fibra
- Sumec International Technology
- Suominen
- Synthetic Industries
- Tainan Spinning
- Tangshan
- Tarunakusuma
- Teijin
- Thai Acrylic
- Thai Rayon
- Tianjin Petrochemical Corp.
- Toray
- Toyobo
- Trevira
- Wei Fang Xin Long
- Wellmann
- Weyerhaeuser
- Yangzhou Fu Wei Er Composite Material
- Zhejiang Yuandong New Polyester

# LIFT BOX COMPACT/LBC

## Double Lift Box Baler

Since decades the Lift-Box-Compact LBC baler is the most successful baling press on the world market. More than 3000 baling press of the AUTEFA Solutions double box system have been sold worldwide.

Two boxes, one at the pre-press and the other one at the main-press guarantee a perfect bale shape for difficult fiber properties, e.g. siliconized fibers, short cut fibers, low melt fibers, mineral fibers. These fibers require a box at the main-press to guide the fibers in the right position during pressing and bale forming.

The baler is available as full automatic, semi-automatic and manual baler. Three different auto-packing solutions ensure high flexibility in terms of economy and production capacity.

### SPECIAL FEATURES:

- 25 t pre-press
- 150 – 500 t main-press
- Double lift-box system
- Manual or full automatic bale packing
- Combinable with wrapping machine Ad-Wrap, Intra-Power Wrap and Intra-Wrap

### SPECIFIC ADVANTAGES:

- 5 – 24 bales/h with manual packing
- 10 – 45 bales/h with automatic packing (related to the amount of straps per bale and the fiber properties)
- Fibers with difficult properties: siliconized fibers, short cut fibers, low melt fibers, mineral fibers etc.

### ADD-ON FEATURES:

#### Hygiene fiber setup

- Avoids contamination of sensitive fibers
- Special feeding concept
- Hygiene pusher set-up
- Reduction of guiding elements

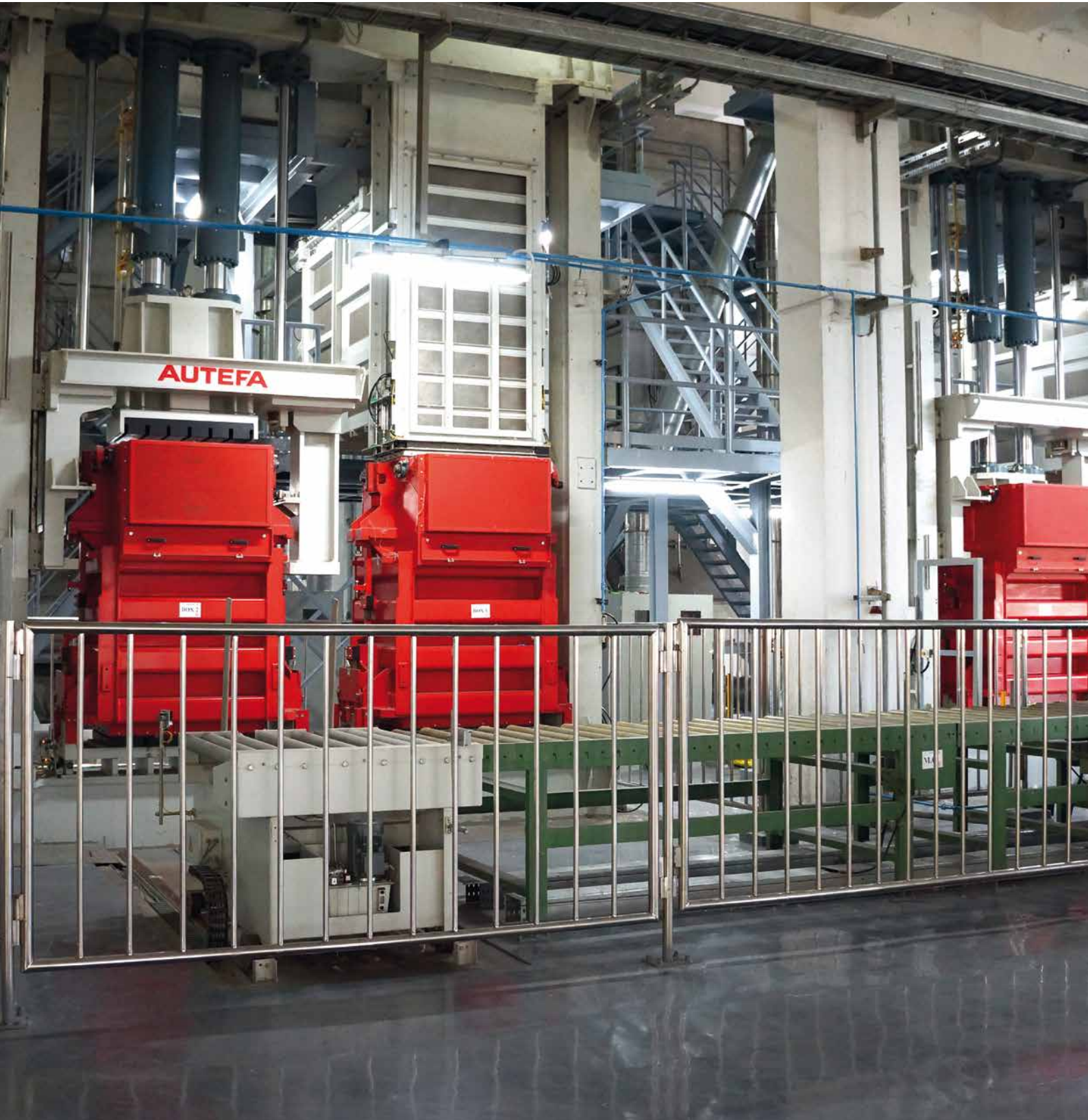
#### Suction system

- To avoid fiber fly and disappearing fibers
- Suitable for short cut, multi colored and hygiene production

### HYDRAULIC:

- Hydraulic pumps with very low noise level
- Separate pumps for pre- and main press
- The compact design of the hydraulic control blocks offers a reliable function and easy maintenance of the control
- An advanced control technique permits the pressing cylinders to move without impacts, even under full load
- Piston rods with special seals
- Visual maintenance indication for all hydraulic cylinders
- Leakage-free hydraulic pipe (screwings with O-rings)
- Permanent oil filtration with electronic resp. optic contamination display increases the operating time of the pumps and valves
- Oil/water cooler for constant operating temperatures
- All magnetic valves with LED display
- Electronic pressure sensors control all hydraulic pressures





# NONSTOP-ULTRA

## Single Box Baler

The Nonstop-Ultra Single Box Baler has a main-press pressing force of 150 - 400 t. The baling press distinguishes itself with fast speed and less space requirement. During the packing process the fibers will be protected. High security standards and easy operation are additional advantages. In a pre-press the fibers will be compacted to a pre-press bale which will be transferred to the main-press without a press box.

Due to the fact that the fiber transfer is done without friction to the fiber and the already prepared packing material at the pre-press ram, there is no damage to the fiber and no breakage of the packing material. The baler guarantees well-shaped bales and is designed as a very robust construction. It can be combined with a fully automatic packing system at the main-press.

Subject to bulk density, handling time and hydraulic performance, capacities of up to 15.000 kg/h can be achieved. A maximum bale weight of up to 450 kg can be accomplished depending on material specification and bale dimensions. It is possible to extend the baling system with a bale removing carriage as well as a bale transport system at any time.

### SPECIAL FEATURES:

- 40 – 80 t pre-press
- 150 – 400 t main-press
- Transfer fork => to handle the fiber bales from pre-press to main-press
- Manual or full automatic bale packing
- Combinable with wrapping machine Ad-Wrap and Intra-Power Wrap

### SPECIFIC ADVANTAGES:

- 5 – 35 bales/h with manual packing
- 10 – 62 bales/h with automatic packing (related to the number of straps per bale and the fiber properties)
- Short main press cylinder  
=> less oil and power consumption
- Short main-press cylinder  
=> shorter cycle time, higher productivity
- Low space requirement
- More space for the operator for a safe handling at the machine
- No pitting due to direct mounting on the ground

### HYDRAULIC:

- Hydraulic pumps with very low noise level
- Separate pumps for pre- and main press
- The compact design of the hydraulic control blocks offers a reliable function and easy maintenance of the control
- An advanced control technique permits the pressing cylinders to move without impacts, even under full load
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- Visual maintenance indication for all hydraulic cylinders
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## Automatic Packing Solutions

- **INTRA-WRAP/IW**  
*Fully Automated Packing Solution*
- **INTRA-POWER WRAP/IPW**  
*Fully Automated Packing Solution*
- **AD-WRAP**  
*Fully Automatic External Bale Wrapping*

**THREE SOLUTIONS FOR DIFFERENT TARGETS AND CUSTOMER NEEDS IN COMBINATION WITH:**

- NONSTOP-ULTRA Single Box Baler
- LIFT BOX COMPACT/LBC Double Lift Box Baler
- UNI-FORK Transfer Fork



# INTRA-WRAP/IW

## Fully Automated Packing Solution

More than 120 staple fiber lines have been automated with the Intra-Wrap packing system. There is no other automatic wrapping and strapping system that is used equally often. Capacities of approx. 28 bales/h are achieved with Intra-Wrap and different wrapping materials can be used, e.g. PE-film or PP-woven. Intra-Wrap can be integrated in the Lift-Box-Compact or Nonstop-Ultra balers.

### SPECIAL FEATURES:

- 5 – 28 bales/h
- Can be integrated in Lift-Box-Compact or Nonstop-Ultra balers as full automatic packing
- 3 sheet packing (top and bottom sheet wrapped with one complete belly wrap piece)
- With folded belly wrap
- Belly wrap is tightened and fixated under the strapping material
- Suitable for PE-film, PP-woven and PE-straps
- Welding connection with temperature controlled heating system
- No dust or abrasion of the strapping belts due to the heat melt technology

### SPECIFIC ADVANTAGES:

- Internal packing avoids fiber contamination in multi-color production lines
- The packing inside the main-press assures the optimum bale shape. The packing will be done under pressure of the main-press.



# INTRA-POWER WRAP /IPW

## Fully Automated Packing Solution

Intra-Power Wrap, a fully automatic packing solution, enables the reliable protection of fibers against any kind of contamination during transport or intermediate storage due to a consistently high wrapping quality. Intra-Power Wrap is a solution for the increasing demands regarding baling press technology caused by the new high- capacity fiber lines. The packing solution unit is integrated in AUTEFAs baling press Lift-Box Compact Double Box Balers or Nonstop-Ultra Single Box Balers.



### SPECIAL FEATURES:

- 5 – 62 bales/h
- The extreme high capacity can be realised due to a belly wrap process with 2 film coils moving parallel to the bale
- Welding of the belly wrap at 2 sides:
  - With ultra-sonic for PP-woven
  - With heating bars for PE-film
- Can be integrated in Lift-Box-Compact or Nonstop-Ultra balers as full automatic packing
- 4 sheet packing (top and bottom sheet wrapped with 2 welded belly wrap pieces)
- Welded belly wrap
- Suitable for PE-film, PP-woven and PE-straps
- Welding connection by heating system (temperature controlled)
- No dust or abrasion of the strapping belts due to the heat melt technology

### SPECIFIC ADVANTAGES:

- Internal packing avoids fiber contamination in multi-color production lines
- The packing inside the main-press assures the optimum bale shape. The packing will be done under pressure of the main-press.



# AD-WRAP

## Fully Automatic External Bale Wrapping

The patented bale wrapping machine Ad-Wrap is a high-quality solution for bale wrapping outside of the baler providing plenty concepts of utilization at comparatively low costs.

This efficient technology is a perfect upgrade for manual balers and therefore leads to a fully automatic packing process.

### SPECIAL FEATURES:

- 5 – 60 bales/h
- One bale wrapping machine Ad-Wrap can be combined with several main-presses or one single-baler
- Changing of the packing material without interruption of the baler
- Can be used for manual installations as an automation solution
- Can be integrated in Lift-Box-Compact or Nonstop-Ultra balers as full automatic packing







# BALES PACKED BY AD-WRAP

## Fully Automatic External Bale Wrapping Ad-Wrap

The wrapping machine Ad-Wrap offers an easy and economical solution to upgrade manual installation to a fully-automatic one. Ad-Wrap increases the production volume for fiber lines.

Such a modification does not interfere with existing control systems and can be done with almost every baling press.

### SPECIFIC ADVANTAGES:

- The overlapping end elastic film bags guarantee a sealed bale packing
- No contamination due to insects or water
- Strapping belts protected by film above
- Low risk of strapping belt breaking
- Easy unpacking of the bales due to the handling of only 2 bags
- Easy recycling of the PET film bags
- 80-200 µm of PET stretch film will be possible to optimize the costs and the safety of packing up the needed requirements



# UNI-FORK

## Transfer Fork

The Uni-Fork optimizes the process of bale pressing and increases the efficiency and capacity. The Uni-Fork intelligent concept is a robotic solution which is working together with several fiber presses and combines the operation of several pre- and main-presses.

The central idea is a robotic fork, which is acting as a flexible transfer truck for one or more pre-presses and to operate one or more main-presses.

The cut staple fibers of several independent working fiber lines are fed to different pre-presses. These fibers will be pre-compacted and prepared in a press box for the transfer of an individual working main-press. Related to the capacity or the redundancy more main-presses can be used and connected by the Uni-Fork system.

The Uni-Fork can be integrated only with the Nonstop-Ultra balers system. For the packing automation AUTEFA Solutions offers the Intra Power-Wrap or the Ad-Wrap.

### SPECIAL FEATURES:

- Transfer Fork: to handle the fiber bales in two axes
- Combining several pre-presses with one main-press
- Combining several main-presses with one pre-press
- Transfer plate for a safe and stable fork ejection at the main-press
- Hard chromium and fine polished fork blades

### SPECIFIC ADVANTAGES:

- High capacities: 5 – 120 bales can be transferred
- Evacuation of the pre-pressed fiber bale without friction
- The transfer fork does not touch the main-press ramp while entering
- Fast movement of the fork creates higher capacities due to shorter cycle time







UNI-FORK with 3 pre-presses and 6 main-presses



# UNI-FORK

## Transfer Fork

The UNI-FORK intelligent concept saves costs with a very small investment for a fully automatic process while improving quality. One AUTEFA Solutions UNI-FORK operates one or more pre-presses and one or more main-presses. The system leads to a strong reduction of personnel costs, high availability of the machine and a short amortization period.



Transfer Fork UNI-FORK







UNI-FORK with 1 pre-press and 2 main-presses



# AUTOMATION OF TOW INSTALLATIONS

## Tow Plaiters & Balers

Various technological requirements render the automation of tow installations a very demanding task. According to the specific requirements AUTEFA Solutions provides specialized equipment for:

- Converter-Tow
- Compact-Tow
- Acetat-Tow (cigarette tow)

An automation of the entire process from the tow plaiter to the bale transport is possible due to the modular design.



### SPECIAL FEATURES:

- **Tow plaiter**  
The tow is plaited in moveable containers. The plaiting procedure can be controlled on all three axes individually. Additionally the tow quantity can be programmed during the plaiting motion by means of the patented control system "Profiling". The plaiting quality is additionally optimized by automatically keeping the distance between the plaiting funnel and the tow surface constant. Thus the often high demands regarding precise tow plating are completely satisfied.
- **Container transport**  
The full container is transported into the press by the container transport system after the automatic container exchange full-empty
- **Baling press**  
With fully automatic wrapping and strapping system Intra-(Power)-Wrap
- Connection to an **automatic bale transport system**







# AUTOMATICALLY

## from the Baler to Bale Dispatch

Highest efficiency of a fiber line can only be achieved by consequent automation of the complete final stage of fiber production. AUTEFA Solutions modular system allows to automate certain sections step-by-step, finally resulting in a fully automatic baling system.

### AFTER WRAPPING AND STRAPPING AUTEFA SOLUTIONS OFFERS THE FOLLOWING STEPS IN THE AUTOMATED PROCESS:

- Moisture measuring (if required)
- Bale weighing
- Labelling
- Sorting and pre-stacking  
The pre-stacker identifies the bale data relevant for storing, sorts the bales according to this data and stacks them in such a way that they can be stored-in by the storage and retrieval unit or by the storage robot.
- Storing-in
- Storing-out
- Control  
Central control of all transport and warehouse components executes the entire warehouse administration as well as the data exchange with superior control systems





# AUTOMATION

## of the Bale Warehouse

Depending on the requirements and specifications AUTEFA Solutions supplies high bay storage and bloc storage systems. Both systems have numerous advantages in common:

### OPTIMAL UTILIZATION OF STORAGE AREAS:

- Storage robots or storage & retrieval units have lower manipulation space requirements than fork lift trucks

### LOWER OPERATIONAL COSTS

- Considerably reduced personnel costs
- Less overhead expenses for illumination and heating

### AUTOMATIC WAREHOUSE ADMINISTRATION

- Central control, coordination and supervision of all internal automatic processes
- Storing-in according to qualities and sorts
- Additional quality criteria can also be assigned after storing-in
- Statistics regarding stock – storing-in (production) – storing-out (dispatch) according to qualities and sorts are accessible at any time
- No warehouse personnel required – no human faults
- Permanent data exchange between warehouse administration computer and superior host computer



# HIGH RACK WAREHOUSE SOLUTIONS

planned and realized together with AUTEFA Solutions

As automation and logistic specialist, AUTEFA Solutions is working together with international partners for the realization of modern warehouses. The challenge for an automatic warehouse is not the building itself, it is the understanding of the logistic needs and requirements related to the permanent production, man power and the replacement period in relation due to production and sales.

## THE MAIN HEADLINES AND QUESTIONS FOR THE PLANNING AND REALIZATION OF AN AUTEFA SOLUTIONS WAREHOUSE:

- How to connect the production of several bales with different product qualities and colors?
  - Weighing, labeling, stacking and palletizing
  - How to transport the bales safely to the loading point of the warehouse?
  - Functional area requirements (qualitatively)
    - receiving area
    - storage area/building for pallets
    - picking area
    - parking area
    - shipping area
    - office space
    - social areas like canteen, conference rooms, etc.)
  - Product Characteristics
    - sprinkle ring required?
    - fire classification
  - Item Specification
    - Total number of items
    - Thereof palletized
  - Volume Specification (storage place requirements)
    - Total number of storage places required:
    - Thereof pallets
  - Performance Data (inbound)
    - Total performance required per shift:
    - Thereof pallets
  - Performance Data (outbound)
    - Total performance required per shift:
    - Thereof pallets
  - A,B,C-allocation:  
How many items will utilize which performance?
    - 20 % fast-movers (A-items)
    - 30 % middle-movers (B-items)
    - 50 % slow-movers (C-items)
  - Seasonal Performance Fluctuation in %  
(average month = 0)
  - Order Structure
    - Order lines per order
    - No. of orders per loading aid and day
  - Space Requirements of your current storage
    - total area: ..... m<sup>2</sup>  
(receiving, storage, shipping)
    - storage area itself: ..... m<sup>2</sup>
  - Climatic Requirements
    - Local building requirement
- Computer-equipment/-functionalities:**
- Hardware/Operating System
  - Does a HOST-computer (ERP) system already exist?  
Does the HOST:
    - process the orders
    - process the incoming goods
    - label the incoming goods
    - control and supervise the stocks
    - provide the dispatch of documents
  - Does a warehouse administration computer system (WAC) exist?
    - Is a WMS (warehouse management system) system required?
    - Operating System UNIX/LINUX or Windows?
    - Data Base ORACLE possible?
    - preferred Hardware Platform (e.g. Compaq, HP)?
  - Desired functionality
    - Is an on-line WMS-HOST interface necessary (or is a periodic file transfer (FTP) sufficient)?
    - Is it necessary to administer pallets from which items were already picked?
    - Is there a priority-classification of the goods (i.e. are there goods of higher or lower importance; respectively of higher or lower handling frequency)?
    - Do the orders for the retrieval of goods come from the HOST or are they initialised by the WMS?
    - Is an inventory-check desired or necessary?









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