

ACCELERATE YOUR LOGISTICS 4.0

DRY TOWER



MORE THAN JUST DRY AIR

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3D arrangement sketch

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The cabinet's structure

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Maximum automation level

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Perfect storage conditions for electronic components

CONVEYING TECHNOLOGY

Minimizing walking distances

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Reduced staff engagement times

SAMPLE APPLICATION 1

Storage for opened packages

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Decentralized warehouse for boxes

SAMPLE APPLICATION 3

Centralized warehouse concept

PROJECT DEVELOPMENT

Conception and implementation



JOS BREHLER

CEO TOTECH EU



When we started developing our Dry Tower back in 2010, as a manufacturer of dry cabinets we were facing the challenge of offering our customers large-scale storing options. It took us only a little while and a few discussions with our customers to realize that we would have to think beyond our limits at that time. The result was an integral logistics solution that far exceeds common component storage systems and is to many producers of electronic components the customized solution to implementing the industry 4.0-concept. Thinking outside the box, the desire to make the impossible come true and quality awareness are our foundation.

A stylized, handwritten signature in black ink, consisting of a series of loops and a long horizontal stroke.

Jos Brehler
Ceo Totech EU



ABOUT US

OUR SERVICE COMMITMENT

Being market leader in the production and distribution of drying, warehousing and logistics equipment, we see ourselves as a specialist in technology for drying and storing electronic components. Our patented drying technology and longstanding experience in component monitoring make us a competent partner for traceability and warehousing (logistics). Responding to the industrial change 4.0, we entered into a strategic partnership with SEGER Automation & Logistik GmbH in 2012 and jointly developed Dry Tower in order to provide our customers with a fully-automatic, single-stage and integral logistics solution. Today, Dry Tower is our product in the market ready for serial production and customizable to individual needs and requirements.

All this is subject to our service commitment:



- ✔ reduced staff engagement times
- ✔ maximum volume consolidation in the warehouse
- ✔ shorter lead times
- ✔ maximum automation level
- ✔ perfect documentation

DRY TOWER

THE SYSTEM

Process-optimized re-drying at 60 °C and ultra-low residual moisture content <1% RH allow the user to quickly reset the floor lifetime in an individually air-conditioned segment of the cabinet.

Interim storage in accordance with the paternoster-approach allows for placement of components into storage while others are being simultaneously removed from it.

All containers within the system are optically measured to facilitate their volume-optimized storage.



Height of the storage racks available up to 6 meters.

The drawer height inside the storage rack can be increased in 5 mm-steps up from 25 mm. The storage rack can thus be perfectly adapted to the packages to be stored.

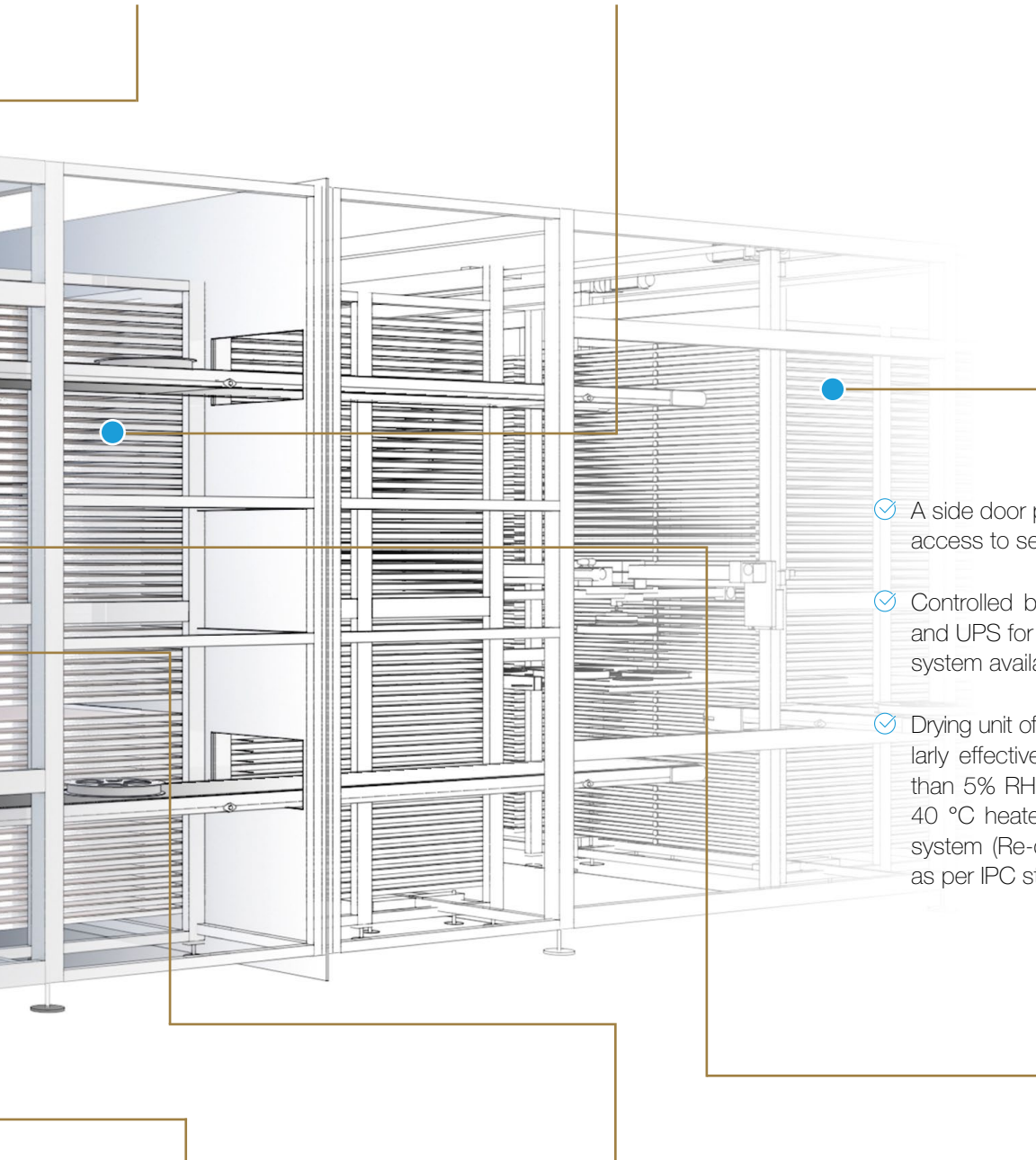
A terminal for redundant control computers has been installed right next to the robot. They parameterize the robot and facilitate manual access to the stored content.

ESD-proof construction of robot and housing.

Heavy-duty profile structure with linear guides serves to reduce the moved masses.

Drawers with a surface of up to 1.5 m² can be individually arranged at height-steps of 5 mm to facilitate best volume utilization.

Unlimited extension options by combining various modules.



- ✓ A side door provides convenient access to service the system.
- ✓ Controlled by two parallel computers and UPS for ensured & extremely high system availability of > 99%.
- ✓ Drying unit of series U-7000 for particularly effective dehumidification of less than 5% RH. Optionally available with 40 °C heater that tempers the entire system (Re-drying of moist packages as per IPC standards).

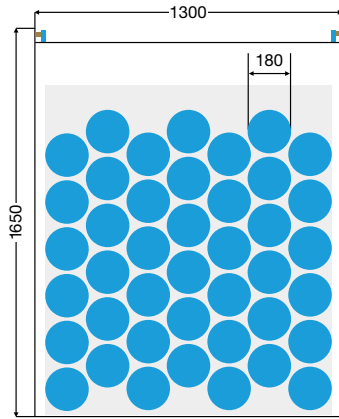
Conveyor lines ensure the quick input and output of goods. A combination of switches and lifts allows for the automatic supply of even distant removal points e.g. right at the line's supply - within just a few seconds.

Special vacuum gripper for reels, trays and boxes of small parts.

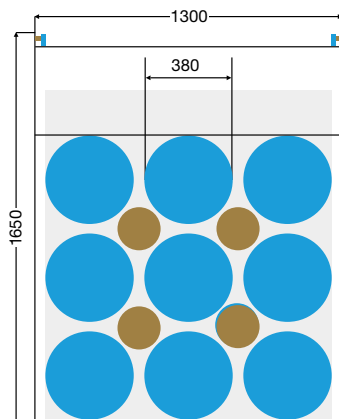
Energy-efficient and low-maintenance drive technology serves to transport packages with high-quality drives "Made in Germany".

DRAWERS

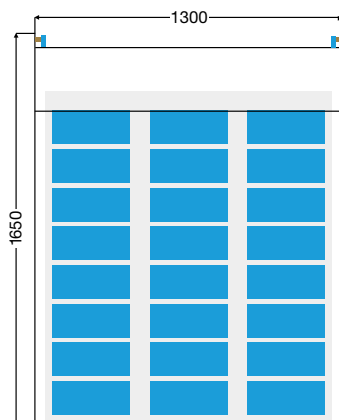
MAXIMUM VOLUME CONSOLIDATION



DRAWER LAYOUT **WITH 7" REELS**

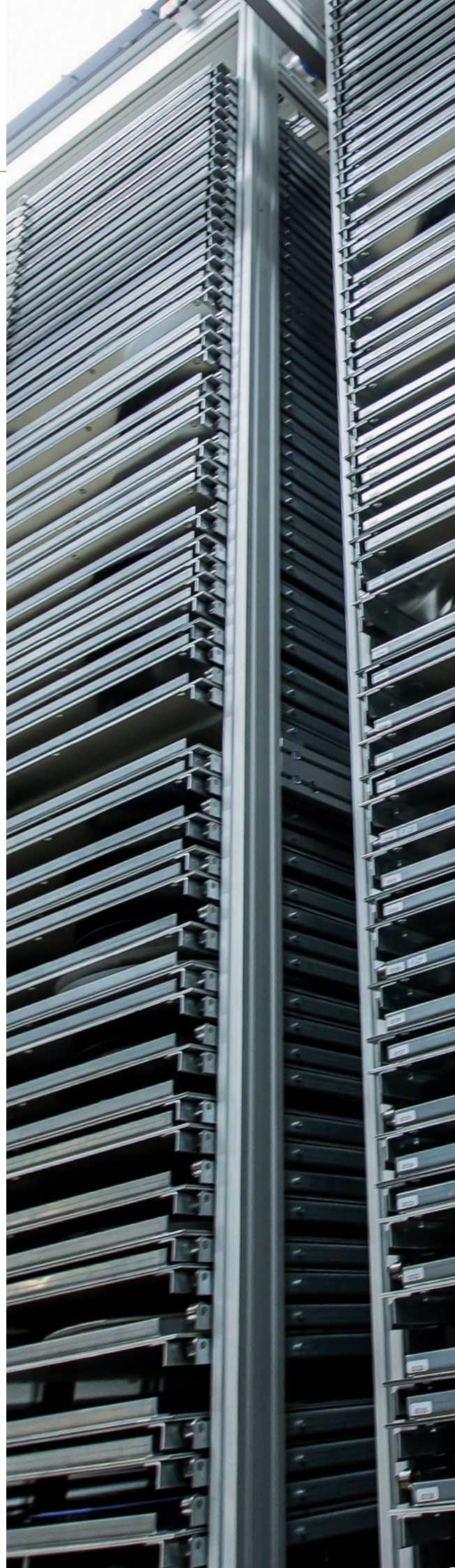


DRAWER LAYOUT **WITH 15" AND 7" REELS**



DRAWER LAYOUT WITH
STACKED TRAYS OR BOXES OF SMALL PARTS

Sample layouts.
Drawer layouts can generally be customized.



STORAGE CABINETS

UNLIMITED STORAGE IN 3 DIMENSIONS

Each cabinet comes with a maximum surface area of 2.2 m² and - depending on its height and the size of stored packages - accommodates up to 125 drawers with a total utilizable storage area of 210 m². For each cabinet, this means 5,250 reels* if stored individually or 10,375 reels* in case of twin-storage. For single-storage, the drawers have been equipped with anti-slip mats; for twin-storage they provide locating pins.



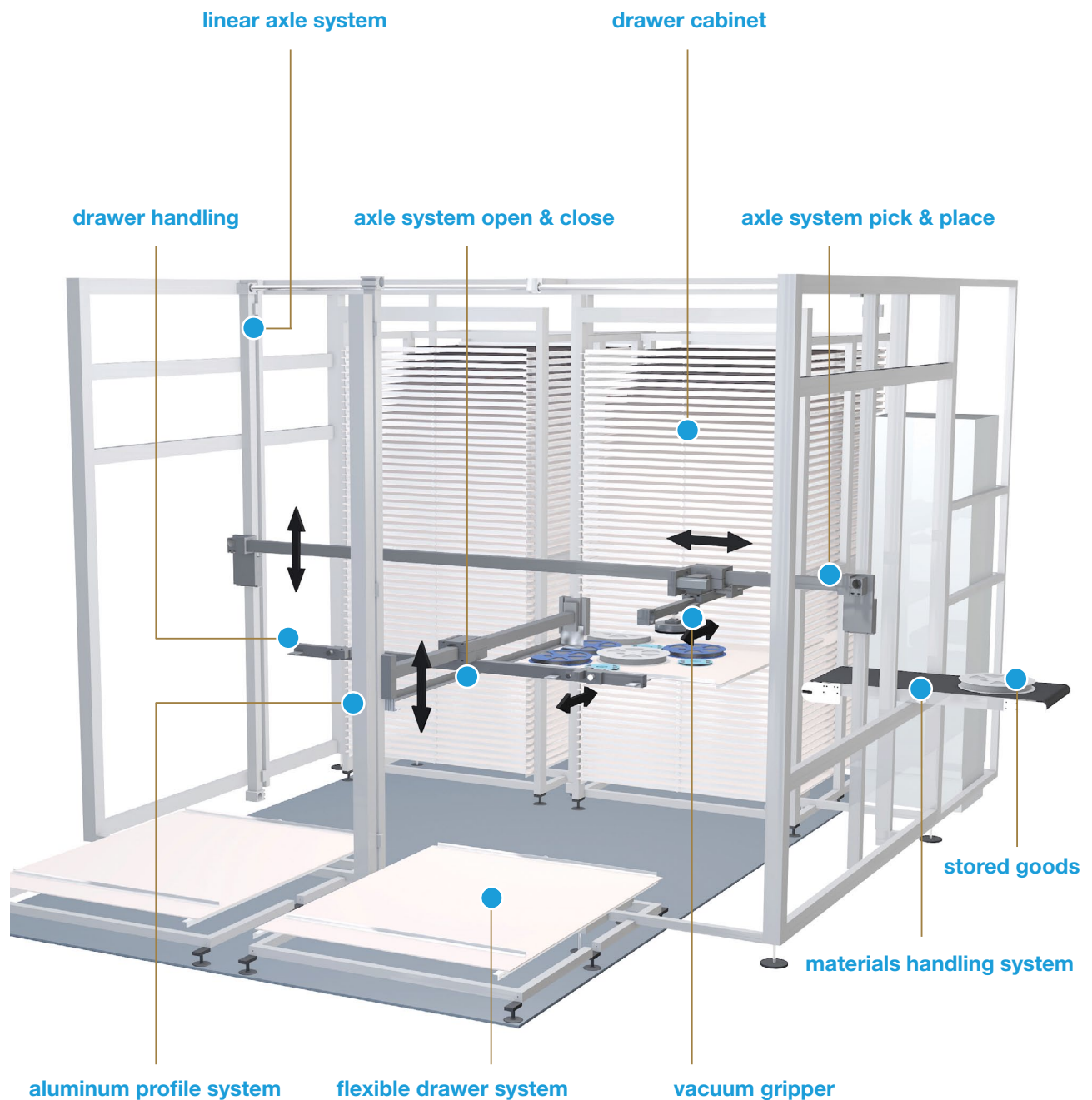
YOUR BENEFITS:

- ✓ manual removal possible, if necessary
- ✓ reliable, highly advanced technology
- ✓ maximum volume consolidation
- ✓ quick access

* refers to reels of 7" in diameter and maximum 15 mm height

THE AUTOMATIC STORAGE SYSTEM

QUICK MATERIAL HANDLING



5 - AXIS GRIPPER SYSTEM

GENTLE COMPONENT TRANSPORTATION

The gripper systems are driven by low-noise and low-maintenance servomotors and move simultaneously within a 5-axis system. Vacuum grippers transport component packages like reels, trays or boxes quickly and safely.

Maximum loads of up to 3 kilos are possible.



YOUR BENEFITS:

- ✓ short access time
- ✓ safe and gentle transportation
- ✓ reels, trays and other unopened packages can be moved





PROGRESS

*“WITH DRY TOWER, WE TOOK ANOTHER
STEP TOWARDS SMART FACTORIES AND
INDUSTRY 4.0”.*

Christian Holzapfel,
Production Manager for Zollner Elektronik AG

INTERFACE

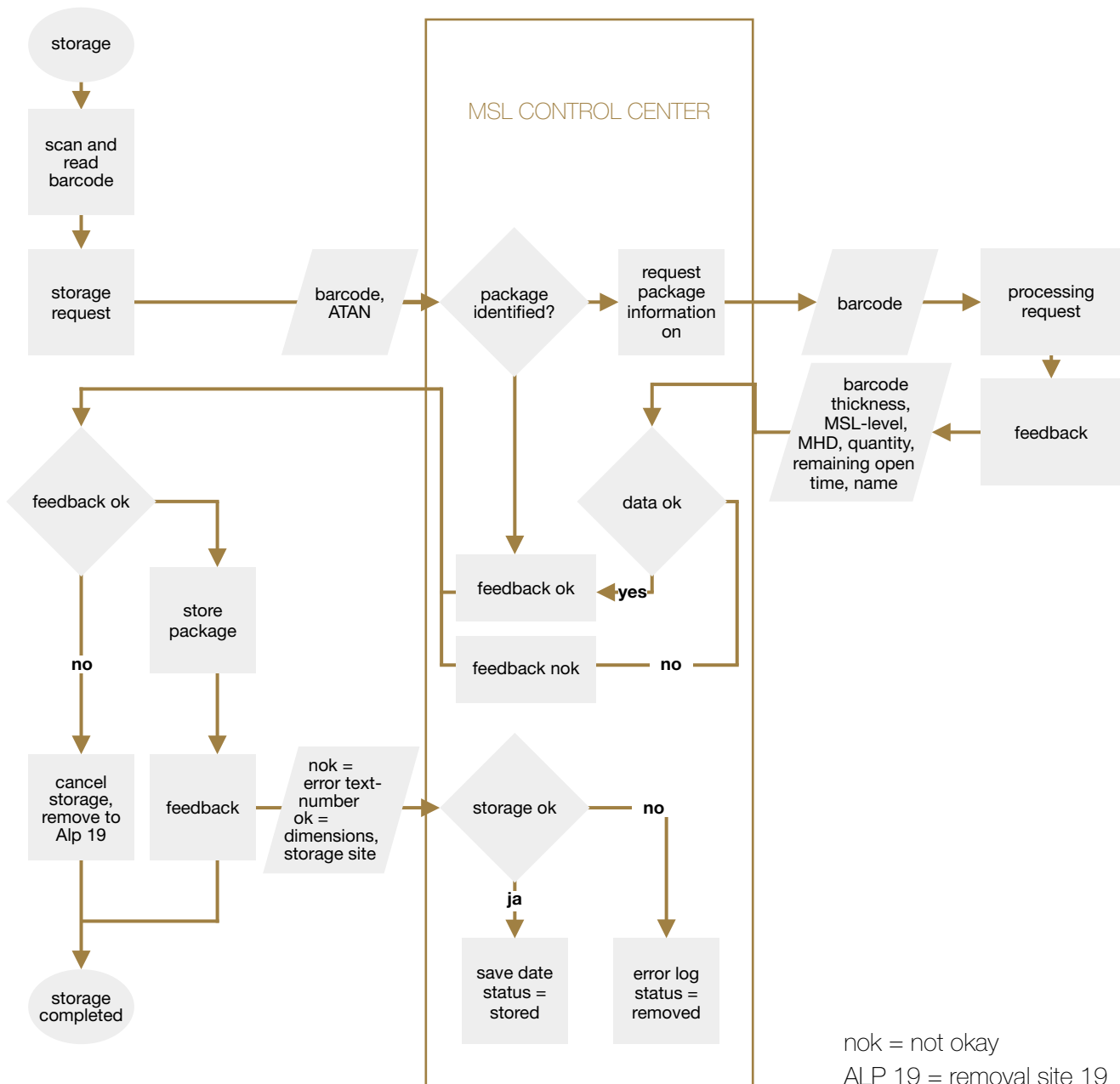
SMART COMMUNICATION

DRY TOWER

STORAGE CONTROL

INTERFACE

SAP



*Sample layout of interface communication between Dry Tower and MES system (storing process).

SOFTWARE

PERFECT DOCUMENTATION

Connection to interface: our interfaces have been designed in accordance with the guidelines issued by the German Electrical and Electronic Manufacturers' Association ZVEI and allow for linking the system to an existing MES system. Our customers benefit from our experience with customer-specific interfaces to Cogiscan (Siemens), Diplan, SAP, ASM and others. We also offer support when our software is being integrated with an existing MES system.

Storage/component monitoring: important storage parameters such as humidity, temperature or operator and assembly orders are logged and available for analysis.

Pick & place function: an integrated pick & place function ensures removal in the order of assembly, just in time and right at the feeder set-up-station. Expiry dates and FIFO principles (including smart FIFO) are observed.

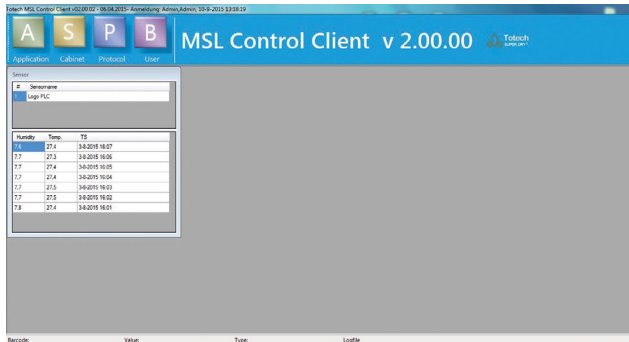


YOUR BENEFITS:

- ✓ flawless monitoring and documentation of drying, hold and open times in accordance with JEDEC
- ✓ automatic pick & place function for initial set-up and follow-up service
- ✓ integration to existing MES systems via customer-specific interface
- ✓ unlimited control and traceability throughout the entire logistics chain
- ✓ individual storage strategies are feasible

MSL CONTROL CENTER

KEY DATA AVAILABLE AT A GLANCE



MSL Control Client v 2.00.00

#	Humidity	Temp	TS
1	27.1	14.02015 16:57	
77	27.3	14.02015 16:55	
77	27.4	14.02015 16:55	
17	27.4	14.02015 16:54	
17	27.5	14.02015 16:53	
77	27.5	14.02015 16:52	
18	27.4	14.02015 16:51	

TOWER MONITORING

- online humidity and temperature control
- clearly arranged key process parameters
- alarms are generated as soon as limit values are exceeded
- external storage sites can be integrated

MSL Control Client v2.00.00 | 18.04.2015 | Anwender:Admin | 21.10.2015 13:04:47 | Stock protocol

A

S

P

B

MSL Control Client v 2.00.00

Application

Cabinet

Protocol

User

MSL Control Client v2.00.00

18.04.2015

Anwender:Admin

21.10.2015 13:04:47

Stock protocol

Material

Batch

User

from

to

from

to

State

Entry No.

Material

Batch

Stock

Next time

State

User

S.No.

Cabinet

Date/Time

14	Material 891	ID 891	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 15:20
13	Material 891	ID 891	0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 15:04	
12	Material 158	ID 158	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 15:02
11	Material 123	ID 123	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 15:01
10	Material 523	ID 523	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 15:00
9	Material 750	ID 750	0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:57	
8	Material 825	ID 825	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:56
7	Material 823	ID 823	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:54
6	Material 836	ID 836	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:53
5	Material 501	ID 501	0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:43	
4	Material 789	ID 789	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:42
3	Material 789	ID 789	0.000	-0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.9.2015 14:41
2	Material 345	ID 345	21.000 Tage	out	Admin.Admin	0			21.7.2015 10:21
1	Material 456	ID 456	0.010 Stunden	in	Admin.Admin	1	Cab No. 1	21.7.2015 10:18	

COMPONENT MONITORING

- all stored and removed goods are recorded by time stamp and removal order
- remaining processing time for all components is monitored
- drying process is documented
- stored goods are blocked if the remaining processing time is expired or the expiry date is exceeded



MSL Control Client v 2.00.00

Filter	Material	Batch	Remaining time	State	Storage	Qty	Quantity	Expiration date	Release	Last in	Ret in
Cab No. 1	Material 121	ID 121	0.000 hours	in	1	255	21.9.2015	14.02015 15:01	20.9.2015 15:01	20.9.2015 15:01	
Cab No. 1	Material 234	ID 234	343.837 hours	in	1	181912	2	234	20.9.2015	14.02015 15:01	20.9.2015 15:01
Cab No. 1	Material 255	ID 255	0.000 hours	in	1	181912	4	1257	20.9.2015	14.02015 15:01	20.9.2015 15:01
Cab No. 1	Material 456	ID 456	187.000 hours	in	1	0000	26	250	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 750	ID 750	21.000 hours	in	1	0000	26	0000	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 765	ID 765	24.000 hours	in	1	0000	56	1024	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 901	ID 901	21.000 hours	in	1	0000	26	749	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 938	ID 938	180.000 hours	in	1	0000	7	1456	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 823	ID 823	36.000 hours	in	1	0000	1	25	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 525	ID 525	21.000 hours	in	1	0000	26	800	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 750	ID 750	21.000 hours	in	1	0000	4	8000	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material 520	ID 520	72.000 hours	in	1	0000	4	891	21.9.2015	15:00	21.9.2015 15:00
Cab No. 1	Material 151	ID 151	72.000 hours	in	1	0000	4	824	21.9.2015	15:01	21.9.2015 15:01
Cab No. 1	Material 891	ID 891	0.000 hours	in	1	0000	1	178	21.9.2015	14.02015 15:01	21.9.2015 15:01
Cab No. 1	Material	ID 478	21.000 hours	in	1	0000	26	890	21.9.2015	15:00	21.9.2015 15:00

COMPONENT LOGISTICS

- live-tracking-function
- movements within the warehouse are documented
- various statistics functions
- storage logs at the push of a button
- movements within the warehouse are logged
- analysis and evaluation options

AIR-CONDITIONING

PERFECT STORAGE CONDITIONS FOR ELECTRONIC COMPONENTS

Our series U-7000 drying unit ensures relative humidity values of < 5%. When moisture-sensitive components are stored, the processing time sequence as well as the humidity absorption is stopped. Any possible oxidation of sensitive metal surfaces of components is prevented by electrolyte deprivation. Combined with a 40 °C or 60 °C heater, the entire storage system, or a just a separate area within it, can be tempered. Any expired MSL components are thus gently re-dried.

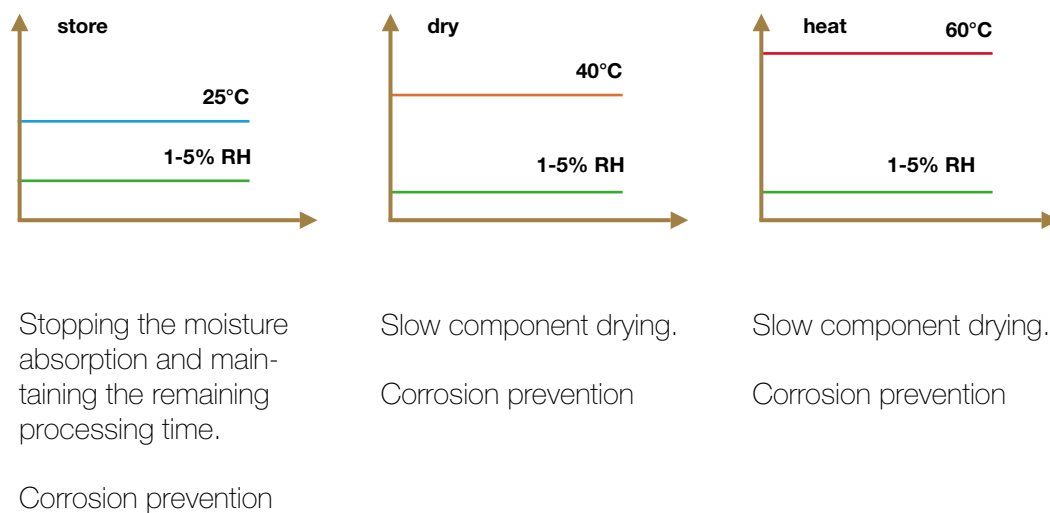


YOUR BENEFITS:

- ✓ continuous component re-drying as per JEDEC standard
- ✓ quick re-drying by a minimum relative humidity
- ✓ optionally available heater (max. 60 °C) accelerates re-drying
- ✓ oxidation processes are prevented

The Dry Tower provides as many as three separate storage areas of different climatic zones. Components are automatically stored and relocated within these three zones in accordance with the remaining processing time.

Examples for climatic conditions:



CONVEYING TECHNOLOGY

INDIVIDUAL AND CUSTOMIZED SOLUTIONS



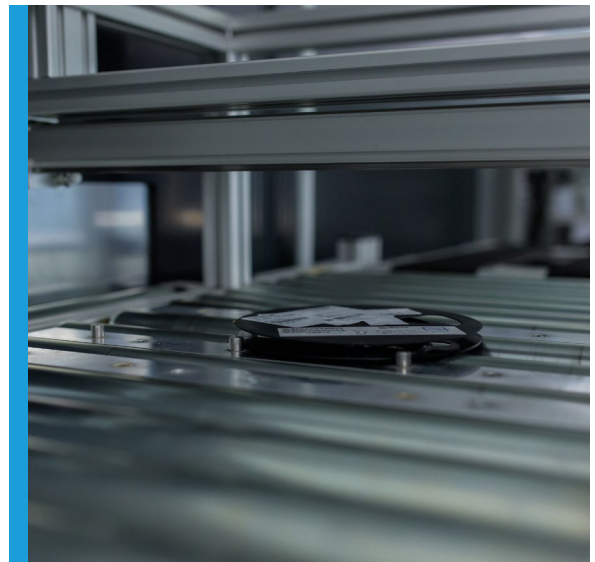
CONVEYOR BELT for quick material handling



PUSHER for direction change (discharge via change)



REMOVAL AT MULTIPLE SITES IS feasible



STOPPER for separation or buffering

JUST-IN-TIME

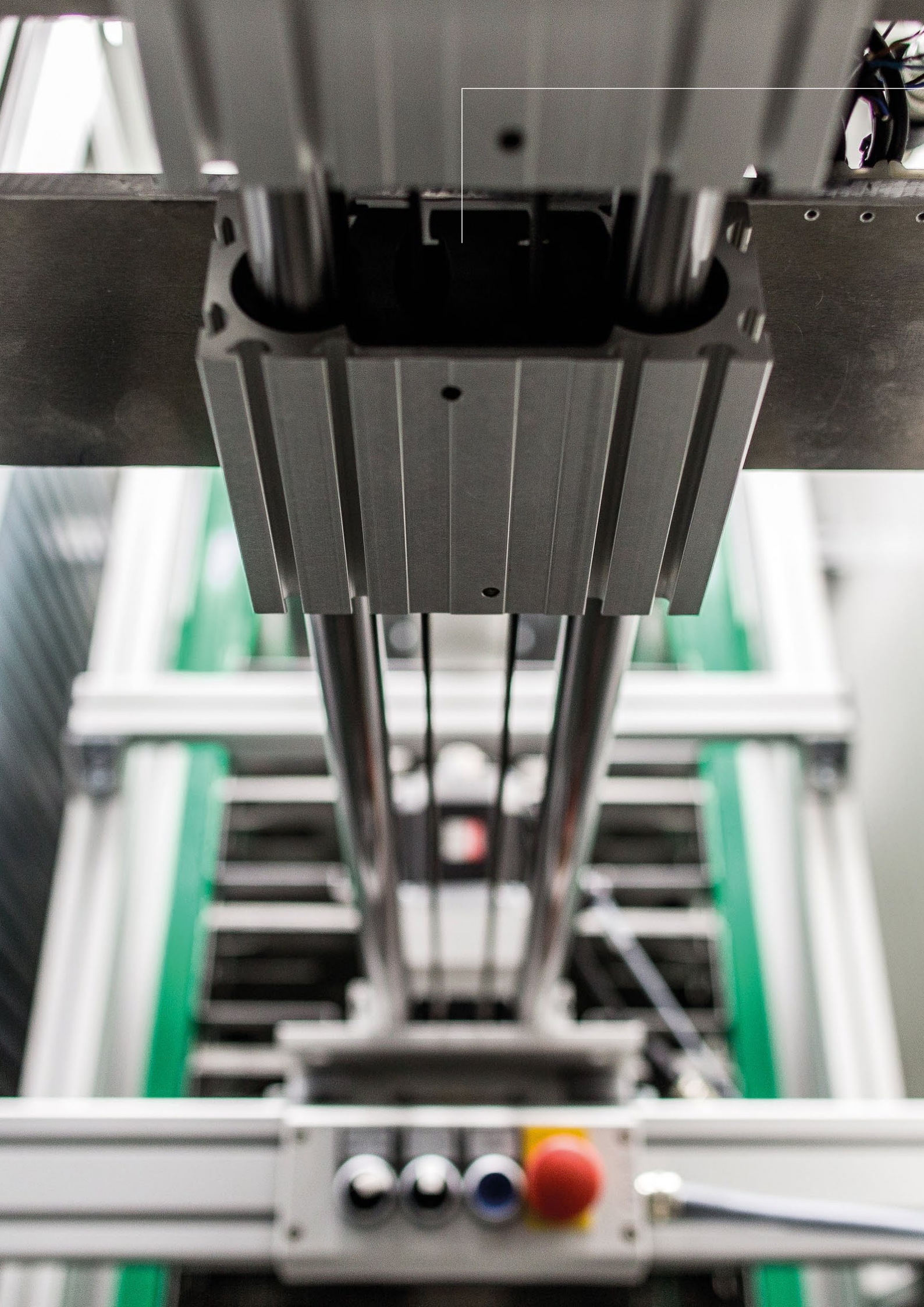
MINIMUM LEAD TIMES

The Dry Tower can be equipped with customized conveying technology for individual packages and/or boxes. Direct follow-up supply of lines is also possible. Centralized, as well as decentralized, removal sites can be realized as customized solutions by deploying roller conveyors, belts, lifts and/or autonomous conveyor systems. This ensures maximum flexibility in component logistics for each and every user.



YOUR BENEFITS:

- ✓ reduced staff engagement times follow-up
- ✓ line supply just-in-time
- ✓ separate storing and removal processes
- ✓ increased component availability



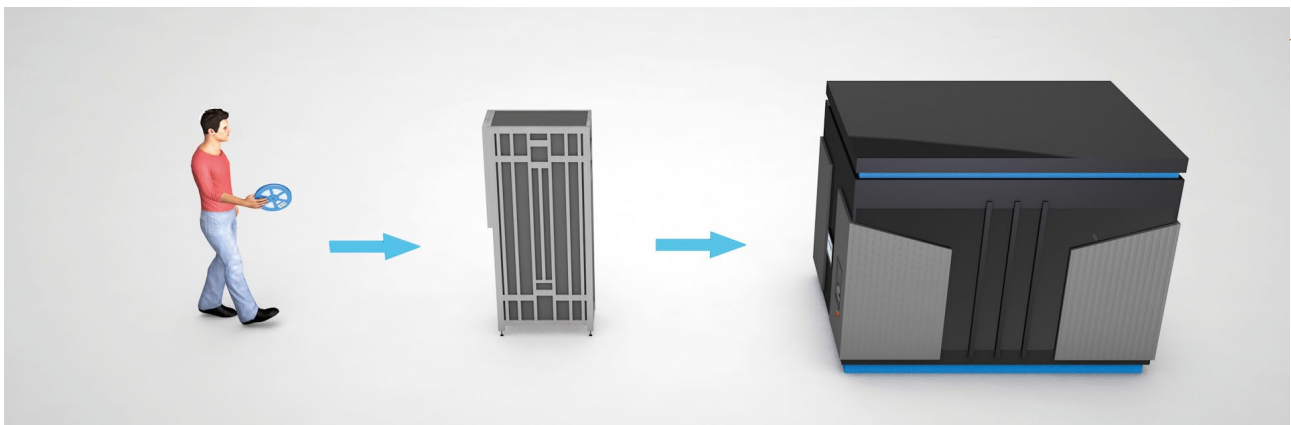
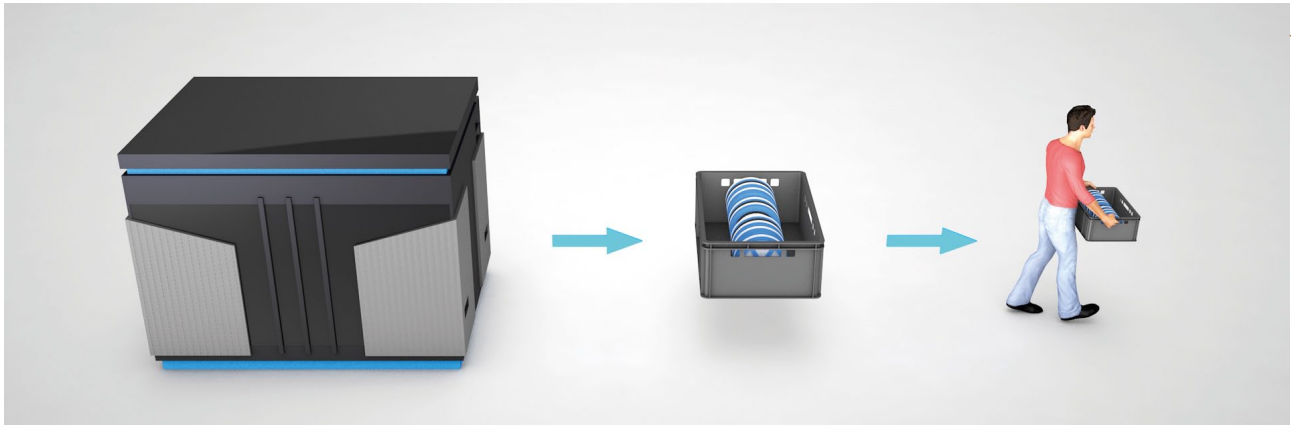
PROFITABILITY

“AUTOMATING THE SMD WAREHOUSE DID NOT ONLY IMPROVE THE BASIC PROCESS RELIABILITY, REDUCE THE AMOUNT OF MANUAL ACTIVITIES REQUIRED AND SPEED UP OUR PRODUCTION PROCESSES, IT ALSO ENABLED US TO MONITOR THE PROCESS OF COMPONENT DRYING, WHICH MEANS A CLEAR ECONOMIC ADVANTAGE FOR OUR BUSINESS”.

Bernd Birkholz,
Business Executive of Birkholz Elektronische Geräte GmbH

STORING & REMOVAL

REDUCED STAFF ENGAGEMENT TIMES



BOX LOADING GANTRY FOR REMOVAL

Packages to be removed are sorted upright and in the sequence requested to SLC containers to ensure quick availability and removal.

BENEFITS:

- sorting in the assembly-sequence required
- large-scale follow-up line supply feasible
- easy availability of individual packages
- preliminary pick & place when the capacities allow for it

BOX LOADING GANTRY FOR STORAGE

Unopened or opened packages are stacked in boxes and moved to the Dry Tower where they are stored fully automatically.

BENEFITS:

- separated storage and removal processes
- reduced staff engagement times
- boxes are removed when the capacities allow for it
- continuous supply with packages to be stored

PATERNOSTER FOR STORAGE

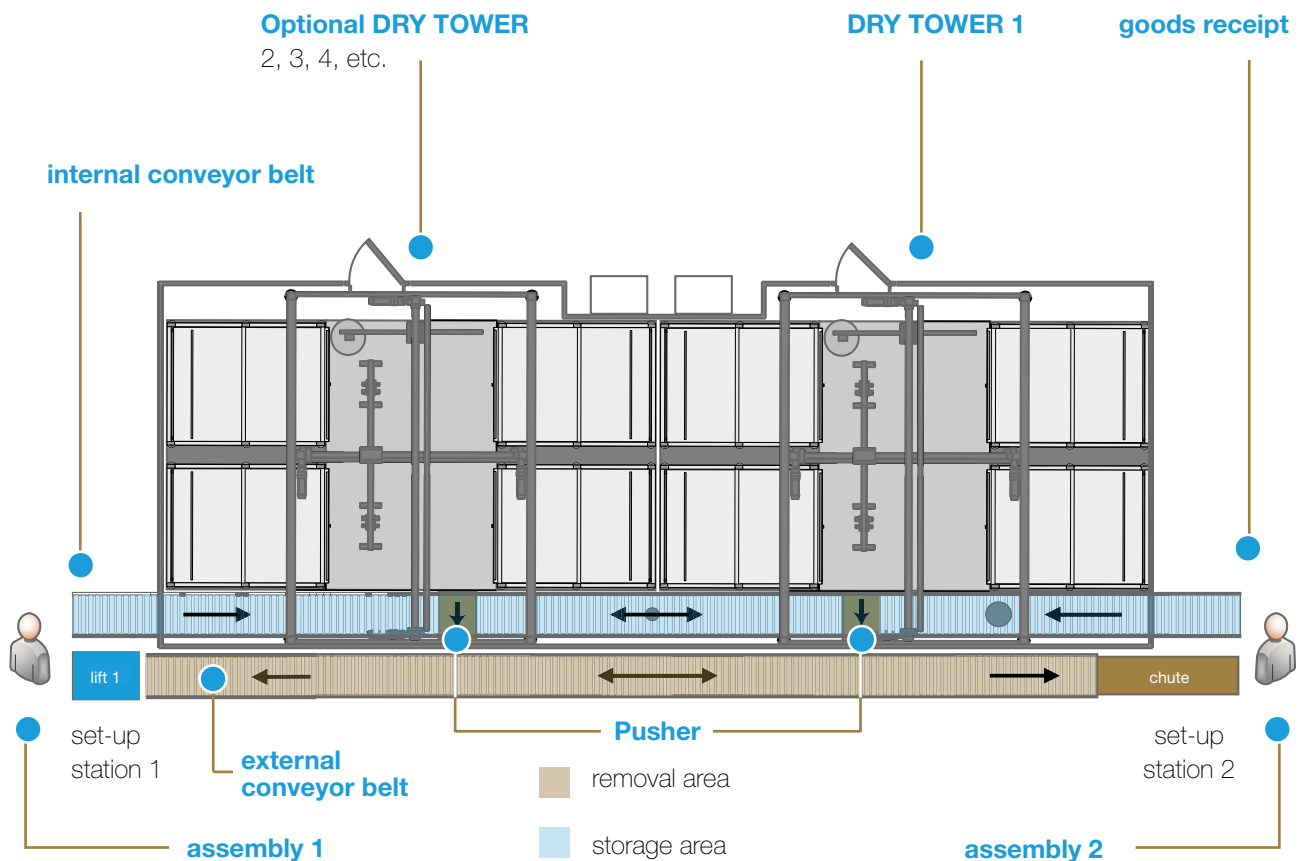
Individual reels are scanned manually and moved to the paternoster, which will accommodate 36 of them and serves as buffer for the Dry Tower. The paternoster is cleared when the capacities allow for it. The Dry Tower is then supplied with the packages.

BENEFITS:

- separated storage and removal processes
 - reduced staff engagement times
 - paternoster is cleared when the capacities allow for it
 - continuous supply with packages to be stored
-

SAMPLE APPLICATION 1

STORAGE FOR OPENED PACKAGES



SITUATION:

frequently changing assembly

large variety of components

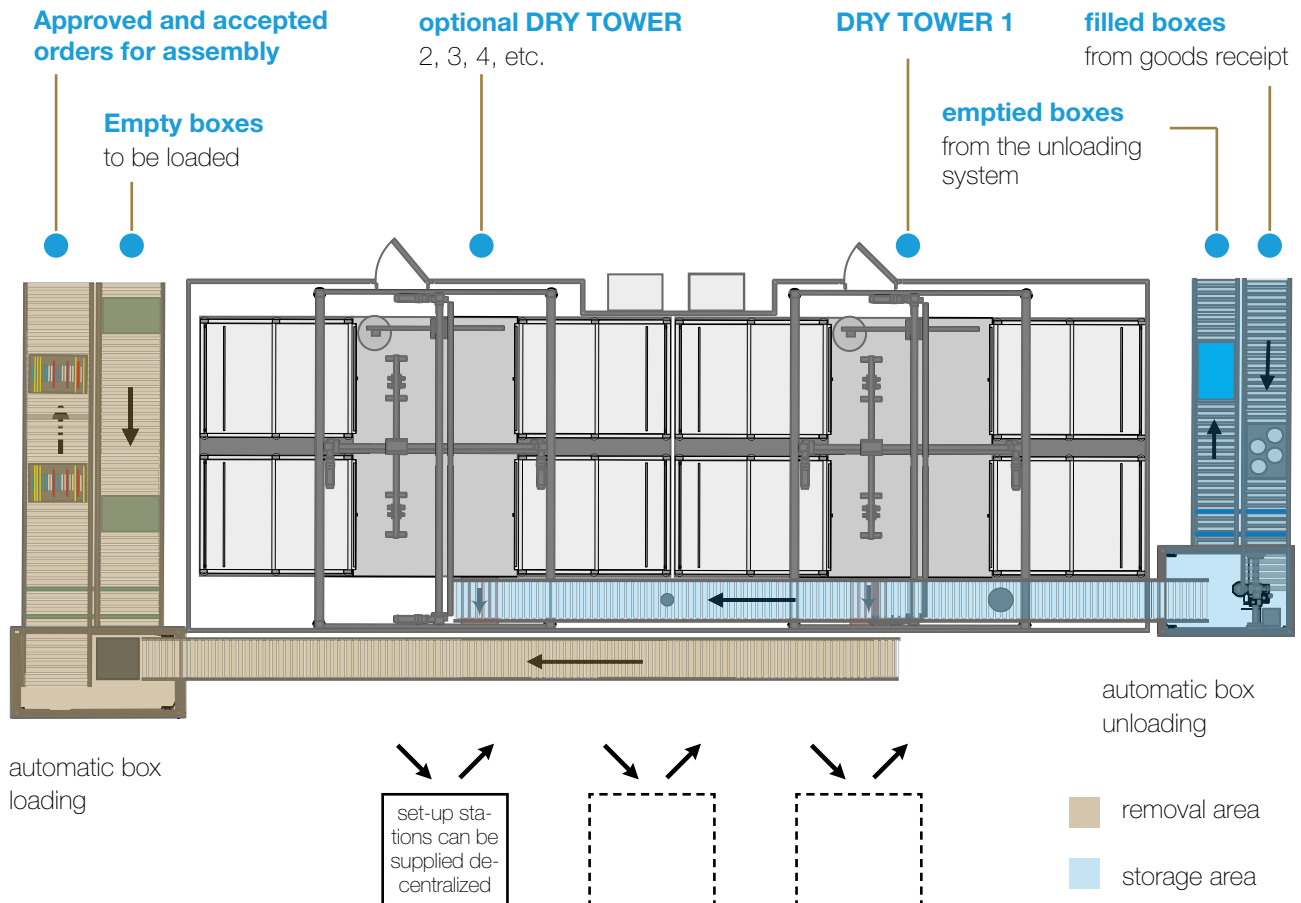
re-storage frequently required

POSSIBLE SOLUTIONS:

- various parallel retrieval lines are feasible
- quick supply of individual set-up stations
- buffering capacities within the conveying line ensure set-up stations are supplied without interruption
- volume consolidation by maximum utilization of the storage space
- transparent storage location management
- separate storage and removal
- buffering capacities (optionally: paternoster, box removal gantry) facilitate the simultaneous storage of various packages
- a high level of automation reduces staff engagement times

SAMPLE APPLICATION 2

STORAGE CONCEPT WITH BOX LOADING AND UNLOADING GANTRY



SITUATION:

large quantities of received goods

POSSIBLE SOLUTIONS:

- box unloading gantry facilitates the simultaneous storage of various packages
- separate storage and removal
- interruptions in removal are used for storage activities
- manual activities (like scanning and placing packages) can be eliminated

high material requirements in the line

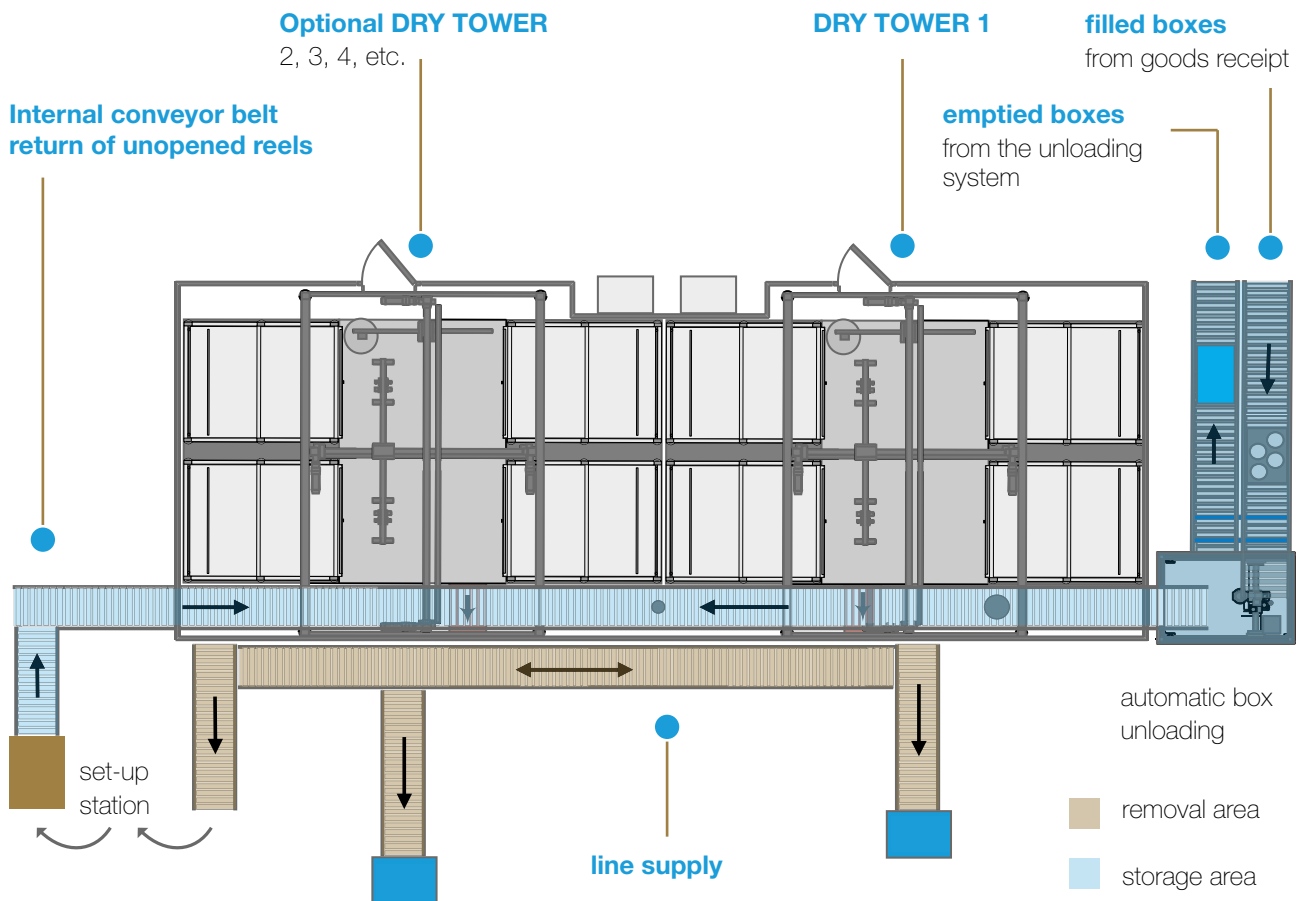
- automatic pre-pick & place in boxes
- several packages are transported / returned at once
- materials are automatically requested by the MES system

large distances between storage and production line

- minimizing the number of times staff have to go to storage
- flexible plant placement
- automatic pre-pick & place prevents idle times

SAMPLE APPLICATION 3

STORAGE CONCEPT WITH AUTOMATIC LINE FOLLOW-UP SUPPLY



SITUATION:

high material requirements in the line (fixed assembly)

large quantities of goods to be re-stored

partly changing assemblies

POSSIBLE SOLUTIONS:

- automatic follow-up supply for individual packages
- MES system can request components
- quick component transportation
- high priority setting for line follow-up supply

- box unloading gantry facilitates the simultaneous storage of various packages
- separate storage and removal
- interruptions in removal are used for storage activities
- manual activities (like scanning and placing packages) can be eliminated

- automatic pick & place
- specific supply of set-up stations through retrieval lines
- re-storage possible right at the set-up station
- possible re-storage in SLC containers
- high component availability due to quick storage and removal



DEVELOPMENT

OF VARIOUS STORAGE CONCEPTS

Dry Tower's modular structure and flexibility allows for the realization of various storage concepts, which are enhanced through the cooperation with our customers in the project planning phase. In this context, we attach great importance to high cost-efficiency.



PROJECT EXECUTION

FROM CONCEPT TO PLANNING TO IMPLEMENTATION

PROJECT PLANNING

PROJECT LAUNCH

*INSTALLATION,
START-UP AND TRAINING*

*PROJECT CLOSURE,
SERVICE AND SUPPORT*

PROJECT EXECUTION

PLANNING AND REALIZATION

1. PROJECT PLANNING

- the amounts of material and types of packages to be stored are documented
- dynamic data is evaluated
- the size of the required storage is determined
- project engineers check out the site
- an individual storage concept is created
- hardware-workshop for planning of detailed conveyor technology
- software-workshop for detailed interface planning

2. PROJECT LAUNCH

- site measurement and inspection
- a 3D-constructional drawing is created
- agreements are made with the technical crew assigned by Totech
- the scheduled installation date is defined
- the plant is set up and tested at the factory

3. INSTALLATION, START-UP AND TRAINING

- configuration of customized interface: ca. 7 days
- installation of the plant: ca. 3 days
- installation of individual conveying technology: ca. 1 day
- start-up and test runs: ca. 1 day
- the Dry Tower can now be filled
- detailed training and safety training of operators on site by one of our service engineers

4. PROJECT CLOSURE, SERVICE AND SUPPORT

- 365 days / year, 24/7 service hotline
- Dry Towers are equipped with ISDN/DSL modem to facilitate free remote maintenance services and software updates at any time.
- The customer's staff is trained to service and repair the system. All assembly work related to trouble-shooting are executed by customer's technical staff.

5. WE OFFER A RANGE OF SERVICE CONTRACT TYPES AND OPTIONS WHICH INCLUDE:

- ✓ 24 hour online monitoring with technical support desk
- ✓ Spare parts allocation and stocking
- ✓ Service Level Agreements to respond to meet your production demands
- ✓ Software upgrades
- ✓ Onsite engineering response for maintenance routines and malfunctions

A photograph of two men in white lab coats standing in a laboratory or industrial setting. The man on the left is looking towards the right, and the man on the right is looking towards the left. They are both wearing white lab coats over collared shirts. The man on the right is holding a clipboard. In the background, there are metal shelving units with various containers and equipment. The lighting is bright and even.

**“THE MORE SIGNIFICANT IT IS,
THE MORE GROUNDWORK A
JOB REQUIRES”.**

HENRI DE SAINT SIMON



MORE THAN JUST DRY AIR

WWW.DRYTOWER.COM

HEAD OFFICE:

Totech Europe B.V
De Linge 28
NL- 8253 PJ Dronten
The Netherlands
Tel. +31 (0) 321 330239
Fax +31 (0) 321 330254
info@superdry-totech.com
www.superdry-totech.com

CONTACT:

Totech Europe B.V
Cardiff Gate Business Park
Cardiff CF23 8RS
UK
Tel. +44 (0) 7973 838275
info@superdry-totech.com
www.superdry-totech.com