

WITT-GRUPPE DISTRIBUTION CENTRE



Sorting system makes distribution easy

The new centre is part of the Witt-Gruppe's Vision 2020 through which it plans to position itself as the most profitable Europe-wide group of retailers in the 50plus market whilst achieving a 50 % reduction in carbon dioxide emissions by 2020.

Case Study Witt-Gruppe distribution centre

LS-4000 sorters are saving more than 26 tons of CO₂ per year

“... a direct energy saving of over 76% per year, compared to sorters using conventional motor technology.”



To allow for major expansion, Witt-Gruppe, has made a 30 million Euro investment in building a new state-of-the-art distribution centre.

The new centre, outside the town of Weiden, Germany, is part of the Witt-Gruppe's Vision 2020 through which it plans to position itself as the most profitable Europe-wide group of retailers in the 50plus market whilst achieving a 50 % reduction in carbon dioxide emissions by 2020.

Efficiency is central to the design of the new centre: Major cuts in energy consumption will be provided by an advanced automated wood-chip heating

system and by the world's first installation of a new generation of 'green' automated material handling sorters. The "green" Crisplant LS-4000 sorters introduce an innovative motor technology which will allow Witt-Gruppe to achieve a direct energy saving of over 76% per year, compared to sorters using conventional motor technology. The three LS-4000 sorters at the Witt-Gruppe site will reduce the environmental impact of the move by saving more than 26 tons of CO₂ per year.



Right from the start: Specification

With considerable experience in specifying material handling systems, the Witt-Gruppe drew up detailed criteria for the new system which, among other details, included the relocation of an existing Crisplant sorter and chutes from Witt-Gruppe's existing warehouse nearby. During the tender process, Crisplant reviewed the Witt-Gruppe's specifications and suggested major changes to the criteria.

The original specification was for the two order processing sorters, operating in batch-mode in the warehouse, to operate on a 700mm cart pitch at a speed of 2.2 metres per second. Crisplant, however, suggested an alternative configuration and speed: Their suggestion was to use a longer pitch of 1200mm and a slower speed of 1.9 metres per second, but to equip each cart with cross belts of two different sizes. Despite running at a slower speed, Crisplant's recommended configuration gives Witt-Gruppe the flexibility to handle items of any size and weight, at any time. This would provide the same overall capacity as the original specification would have been able to support.

During the design phase, Witt-Gruppe and Crisplant agreed to increase the sorter speed to 2.0 metres per second, adding a more than 5% increase to the overall sorting system capacity.



Crisplant also considered the commercial and operational implications of moving the existing sorter from the existing warehouse. Dismantling and re-installing the existing sorter would have seriously compromised productivity at the existing warehouse.

Crisplant's proposal, therefore, included two new LS-4000CB Cross-belt sorters, for order processing and a new LS-4000E tilt-tray sorter for shipping, which would maintain current productivity at the old site and achieve a virtually seamless transition from the old to the new site. These changes, in addition to the fact that Crisplant had already completed a number of successful projects for the company, played a major part in Witt-Gruppe's decision to award the contract for the material handling system to Crisplant.

Benchmark efficiencies: Energy, space, speed

As the distribution centre for the entire Witt-Gruppe catalogue and website, the system must handle a diverse range of clothing and household items, as well as CDs and DVDs. The weight of these items can vary from a few grams to up to 7 kg and include a wide range of shapes.

Items are picked from stock in batches and accumulate in totes before being conveyed to the sorting system consisting of two LS-4000CB cross-belt sorters with five inductions each. At each induction, one person, at a specially-designed ergonomic workstation, manually removes items from the totes and places them into the dynamic induction. To match the picking process, the sorters receive, process and release the items in batches.

The items are conveyed from the packing sorters into 132 packing chutes. In this configuration, one sorter is installed above another and each sorter discharges to a chute in two layers, giving a total of four layers. Each layer has two compartments for holding individual order batches. This provides a total of eight orders in one chute at any time. Two additional chutes are provided for no-read items, two chutes for early or late items as well as one for EAN bar-code control.





Induction of parcels to the LS-4000E Tilt-Tray shipping sorter

Each of the dynamic inductions at the cross-belt packing sorters can process 3000 items per hour, whilst the sorters together in total can handle up to 24000 items per hour.

The control system checks that the items in each order have arrived in the correct batch sequence for the shipping labels which are attached at the chute. The size of the order and the shape of the items determine whether they are packed in bags, boxes or placed on a conveyor for automatic foil sealing, before being conveyed to the LS-4000E Tilt-tray shipping sorter.

A customer specific sorter configuration maximises the shipping sorter capacity. This particular configuration gives two dedicated sorting and discharge areas - one for boxes and one for bags, which makes it possible to achieve a sorting capacity up to 17000 orders per hour.

Orders in boxes go directly on the shipping sorter via two fully automatic inductions for sorting and discharge to boom conveyors leading the boxes directly into trucks for loose reload or discharge for manually separated when packing on pallets. Orders in bags are transported to the shipping sorter inductions in bulk and manually put on three dynamic inductions for sorting and discharge into chutes to be manually

packed into plastic totes, which are stacked and loaded on trucks. Each of the inductions at the shipping sorter can process up to 4200 orders per hour.

Using standard LS-4000 modules, the entire packing and shipping sorter system combines a space-saving footprint with very high capacity. In the course of one year, the complete sorting system handles an average of 180000 items per day in the distribution centre.



Packing sorter:

- Two LS-4000CB Cross-belt sorters
- 10 dynamic inductions (5 per sorter)
- 132 "double-double" two compartment, four layer chutes
- 2 chutes for no reads
- 3 chutes for early and late items as well as EAN control

Shipping sorter:

- One LS-4000E Tilt-tray sorter
- 5 inductions (of which 2 are full automatic)
- 133 chutes (four different types according to various use)

Control System:

Crisplant Software Suite for the Witt-Gruppe site comprises:

- CGS (Crisplant graphical system)/ SCADA
- CIS (Crisplant information system)
- CMC (Crisplant machine controller)
- CSC (Crisplant system controller)
- CWS (Crisplant work station)
- MES (Manual encoding station)
- Software for the large batch progress information screens in the packing and shipping areas
- Hand held scanners with embedded computer system and bar-code scanner.

Production progress (pack_lower)													
Help													
Production progress													
BatchId	Quantity Items Be Sorted	Quantity Items Total	Quantity Orders Per Batch	Total Divide Orders Per Batch	Employee	Correction	Estimated Pack Time	From Packing Till Complete	Batch Begin	Batch End	Loader	Sorter	Packed
32-011	1080	1124	272	4.13	46	81 %	0:06:01	0:07:24	01.02 10:49:54	01.02 10:56:58	98.8%	98.8%	100.0%
32-012	1087	1121	272								99.8%	99.8%	100.0%
32-013	1140	1179	272	4.27	46	83 %	0:06:12	0:06:12	01.02 10:57:19	01.02 11:03:32	99.7%	99.7%	100.0%
32-014	1106	1144	272								98.4%	98.4%	100.0%
32-015	1057	1092	272	4.06	46	81 %	0:06:00	0:10:48	01.02 11:03:32	01.02 11:09:32	99.2%	99.2%	100.0%
32-016	1082	1118	272								99.2%	99.2%	100.0%
32-017	1085	1136	272	4.19	46	81 %	0:06:02	0:08:01	01.02 11:14:20	01.02 11:20:33	99.4%	99.4%	100.0%
32-018	1105	1141	272								99.9%	99.9%	100.0%
32-019	1059	1097	272	4.21	46	83 %	0:06:11	0:07:16	01.02 11:22:22	01.02 11:28:48	99.4%	99.4%	100.0%
32-020	1154	1191	272								98.4%	98.4%	100.0%
32-021	1135	1174	272	4.25	46	83 %	0:06:12	0:08:04	01.02 11:29:38	01.02 11:36:07	99.1%	99.1%	100.0%
32-022	1085	1139	272								98.9%	98.9%	100.0%
32-023	1137	1174	272	4.23	46	83 %	0:06:12	0:06:13	01.02 11:37:43	01.02 11:43:56	99.6%	99.6%	100.0%
32-024	1082	1129	272								99.5%	99.5%	100.0%
32-025	1090	1135	272	4.08	46	81 %	0:06:01	0:06:01	01.02 11:43:56	01.02 11:49:57	99.3%	99.3%	100.0%
32-026	1053	1087	272								99.3%	99.3%	100.0%
32-027	1130	1177	272	4.15	46	81 %	0:06:02	0:06:21	01.02 11:49:57	01.02 12:51:19	99.8%	99.8%	100.0%
32-028	1043	1080	272								99.0%	99.0%	100.0%
32-029	1168	1207	272	4.39	46	83 %	0:06:14	0:06:15	01.02 12:51:19	01.02 12:57:34	99.1%	99.1%	100.0%
32-030	1145	1182	272								99.3%	99.3%	100.0%
32-031	1049	1082	272	4.09	46	81 %	0:06:01	0:06:01	01.02 12:57:34	01.02 13:03:35	99.4%	99.4%	100.0%
32-032	1110	1141	272								99.3%	99.3%	100.0%
32-033	1031	1086	272	4.10	46	84 %	0:06:14	0:07:57	01.02 13:03:35	01.02 13:10:14	99.7%	99.7%	100.0%
32-034	1090	1147	272								99.3%	99.3%	100.0%
32-035	1118	1158	272	4.16	46	81 %	0:06:02	0:06:31	01.02 13:11:32	01.02 13:17:35	98.9%	98.9%	100.0%
32-036	1064	1107	272								99.5%	99.5%	100.0%
32-037	1051	1092	272	4.02	46	81 %	0:06:00	0:06:11	01.02 13:18:04	01.02 13:24:15	99.0%	99.0%	100.0%
32-038	1050	1094	272								98.9%	98.9%	100.0%
32-039	1179	1211	272	4.28	46	83 %	0:06:12	0:00:19	01.02 13:24:15	01.02 13:30:27	99.2%	99.2%	6.3%
32-040	1075	1117	272								99.4%	99.4%	0.0%
32-041	1130	1177	272	4.25	46	83 %	0:06:12		01.02 13:30:27	01.02 13:36:39	25.8%	9.6%	0.0%
32-042	1091	1137	272								57.8%	40.5%	0.0%
32-043	1132	1180	272	4.22	46	83 %	0:06:11		01.02 13:36:39	01.02 13:42:50	0.0%	0.0%	0.0%
32-044	1072	1116	272								0.0%	0.0%	0.0%

Visibly tighter control

The Crisplant control system provides a comprehensive overview of the sorting systems in the packing and shipping areas. The Crisplant system controller at the Witt-Gruppe site provides a complete user interface for sorter control including set up of sort plans, sorting parameters, and all other high level controls features including monitoring of carrier status.

The information system generates standard and customer specific reports, graphs and statistics and a system provides a dynamic graphical overview of the sorters. The system also includes a number of work stations for the maintenance team and site administrators, as well as for the supervisory teams in the two control rooms.

A system controller manages each of the three sorters and monitors the progress of each batch. This batch-progress capability is one of the key features of the system controllers, making it possible to follow batch-sorting progress as a dynamic table at any of the work stations or as a statistical report via a browser.

The batch progress system calculates the estimated and actual packing times, including scheduled breaks, to provide an estimated completion time for each batch. This high level of visibility also increases the efficiency of other logistics tasks, such as coordinating the arrival of trucks at the loading dock.

Dynamic batch-progress tables can be monitored from any work station



Software to optimise production

Large screens, installed by each row of chutes in the packing area, allow staff to monitor the progress of the batches when packing the orders. Actual packing times are displayed against the estimated times for each batch to provide an indication of when the manual packing process should increase speed. In addition, a performance monitor delivers accurate and up-to-date data on the overall sorter performance.

Meeting deadlines: Emulation and test

Extensive emulation and testing during the design and pre-installation stages ensured that Crisplant was able to meet all deadlines, including the final operational hand-over date. Representatives from the Witt-Gruppe attended two Factory Approval Tests (FATs), at the Crisplant Test Centre in Aarhus, Denmark, where live demonstrations were performed using the test sorter and specially designed chutes.



Large screens, installed by each row of chutes in the packing area, allow staff to monitor the progress of the batches.

Time	Event	Part	Info
Id: 3074457345645445028 Result: NORMAL			
2/26/2010 1:32:04 PM	ItemCreatedEvent	S02-L08	Mode=SCANNER
2/26/2010 1:32:08 PM	ItemInductedEvent	S02-L08	
2/26/2010 1:32:11 PM	ItemScannedEvent	S02-SC01	NORMAL. Barcodes=003121860234, 528813900104, 0042234579, 4250313406044
2/26/2010 1:32:11 PM	ItemRedirectedEvent	S02-CHU223.4	
2/26/2010 1:32:57 PM	ItemSortationEvent	S02-CHU223.4	JAMMED
2/26/2010 1:34:10 PM	ItemDischargedEvent	S02-CHU223.4	
2/26/2010 1:34:23 PM	ItemDeletedEvent	S02-CHU223.4	NORMAL
Id: 3074457345645154722 Result: NORMAL			
2/22/2010 3:45:28 PM	ItemCreatedEvent	S02-L06	Mode=SCANNER
2/22/2010 3:45:31 PM	ItemInductedEvent	S02-L06	
2/22/2010 3:45:36 PM	ItemScannedEvent	S02-SC01	NORMAL. Barcodes=003121860231, 0581294539, 905327210110, 4250313406044
2/22/2010 3:45:36 PM	ItemRedirectedEvent	S02-CHU129.4	
2/22/2010 3:46:24 PM	ItemDischargedEvent	S02-CHU129.4	
2/22/2010 3:46:34 PM	ItemDeletedEvent	S02-CHU129.4	NORMAL

Crisplant's graphical supervisory control system provides a complete and dynamical colour code overview of all orders being packed at every stage of the system. This allows blockages at the chutes, sorter jams or other malfunctions to be easily detected to allow the supervisor to radio the exact position to the floor so that it can be resolved without unnecessary search time.

At each induction, a manual encoding station (MES) enables no-read items to be

Induction	S01-L03	Scanner	Day	32	Queue	0
Batch	Remaining	Packtime				
33	11 / 41	37	3:32			
41	0 / 0	39	8:12			
43	0 / 0	41	8:12	(EXCLUDE ITEMS)		
Inducted Items	11833	No-Read	67	Counters		
Next Batch Activated						
Keyboard	Reset Counters	Deactivate	Next Batch			

manually keyed or scanned. A touch-screen display also shows the status information of each batch.

New technology. New vision

With a passion for innovation, the Witt-Gruppe has used state-of-the-art technology, introduced with the LS-4000 sorters, to achieve goals which are central to their Vision 2020 mission: Next-generation efficiencies in high-speed automated material handling, as well as in the use of space and energy, means that the system will support the future expansion of Witt-Gruppe, as well as the future sustainability of world resources.

Item information is available both as statistical reports and on handheld scanners



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