Accurate Distribution and Storage of Agri-food Products

Silos de Tarragona, S.A., located in the Port of Tarragona, offers services related to the loading and unloading of ships and the storage of cereals, grains and pulses and other types of feed by-products.

Today, Tarragona is the leading port for the import of agri-food products to Spain. In fact, it is the natural port of entry for raw materials used to make animal feed, due to its proximity to Spain’s main feed production centers: Catalonia, Aragon and Navarra.

Consequently, SITASA handles unloading, storage and distribution of a large part of the agri-food products of the big national and international importers.

SITASA owns the largest storage capacity within the service area of Tarragona, with 120,000 tons in vertical silos, 135,000 tons in automated warehouses and 30,000 tons in other warehouses within the Port of Tarragona.

Accurate goods transfer for maximum profit
Weight is a crucial factor for SITASA, as exactly the same amounts must be distributed as are received, and the cost of any decreases or variations in weight must be borne by SITASA.

SITASA’s clients commission it to store goods and subsequently distribute them to their customers. Understandably, the control system for incoming and outgoing goods must be highly reliable and accurate. These were the main reasons, why SITASA selected METTLER TOLEDO for its unrivalled precision.
The set-up for receipt of goods consists of three vertical hoppers.

- The first hopper is considered to be the ‘lung’, and its capacity is three times that of the second. Its main function is to store the cargo that is being unloaded from the ship.
- The second (central) hopper is where the weighing takes place. It is fitted with four METTLER TOLEDO load cells, hung from a rack in the structure. The central hopper is filled by bulk flow from the first hopper, the weight is left to stabilize, the cargo is weighed in batches of 8500 kg and unloaded in bulk into the lower hopper.
- The capacity of the third hopper, which is located beneath the first two, is 1.2 times that of the second hopper. This is where the flow of the goods is adapted to the nominal capacity of the facility and sent to the silos.

The information from the load cells is sent to the METTLER TOLEDO process weighing terminal located in the control area, which stores and checks all incoming material, to guarantee the accuracy of the subsequent distributions.

When it comes to distributing the goods, at the Castilla silo, METTLER TOLEDO weighbridges check all delivery trucks. SITASA’s aim is to always ensure quality. At no time is the merchandise touched and therefore it does not deteriorate: its storage and distribution is fully automated. Moreover, traceability is extremely important, given that one type of merchandise should never come into contact with another. SITASA has a whole range of cells and containers for keeping goods separate, and this sets it apart from its competitors.

**Key Features: IND780 Advanced Weighing Terminal**

- Freely programmable process weighing terminal
- Housing: Stainless steel, IP69k
- Mounting options: Panel, desk, wall
- Keyboard: 30-key tactile keyboard with numeric keypad, navigation keys, function keys
- TaskExpert™ flow-chart based software development tool
- Display: Backlit LCD graphic display; 320 × 240 pixels; QVGA, 145 mm; monochrome or active TFT color
- Suitable platforms/weigh modules: Up to 4 analog per channel, POWERCELL® MTX, IDNet Scale, X-Base SICS
- A/D rate: Greater than 366 Hz internal
- Digital Input/Output: Maximum 40 inputs, 56 outputs with internal and external I/O options
- Interfaces: Serial, Digital IO, A-B Remote IO, Profibus® L2 DP, ControlNet™, Ethernet/IP, Modbus TCP, DeviceNet

**FlexMount® weigh modules**

- Capacity range: 110kg–20.41 t (250–45 000 lb)
- 3000e OIML & NTEP 5000d class III
- ATEX and FM approvals Zone 1/21 or Division 1
- IP68 protected load cell
- Anti-lift device restrains tank from tipping
- Carbon steel and stainless steel design

**SWC515 PINMOUNT weigh modules**

- Capacity range: 7.51–22.51 t (16.5–49.6 klb)
- OIML 3000e, NTEP 6000d
- ATEX and FM approvals Zone 1/21 or Division 1
- Stainless or zinc plated hardware
- IP68 protected load cell
- 360° horizontal checking
- Redundant safety features
- Dual optional stabilizers for dynamic scales
The new IND226x weighing system guarantees uncompromising safety in potentially explosive areas. This intrinsically safe terminal can perform a whole range of functions, including checkweighing, manual filling, as well as routine and mobile weighing.

Safe – functional – efficient. These are the characteristics of the IND226x.

Safety without compromise – worldwide
The intrinsically safe design of the terminal allows installation in potentially explosive areas (Division 1 FM, Zone 1/21 ATEX). Thanks to its explosion protection and metrological approvals (OIML & NTEP), the robust IND226x can be used worldwide.

Peripheral equipment, such as a PC, can be connected from a safe area via an RS232 interface using the optional IND serial data interface and the ACM200 interface adapter. Connecting a PC makes it easy to configure and operate the terminal. Alternatively, in potentially explosive areas an additional IND226x can be connected as a second display via the serial remote interface. This can, for example, be used for checking weight data at a different location in the potentially explosive area.

Efficient operation
For manual portioning or checkweighing applications, the IND226x offers an uncomplicated, user-friendly functionality for adjusting the tolerance limits. Activate the application using the F function button, save the target weight and predefined tolerances and you’re ready to go. The LED status displays offer users monitoring the weighing transactions visual indications as to whether the weight is within or outside tolerances.

The unit is tared automatically without the need to press any buttons. As soon as the empty container is on the weighing platform, its weight is saved as the tare weight (net display appears) – fast, time-saving and safe.

Broad range of applications
Thanks to its power supply options, including stationary (PSUx power supply) and mobile (external battery pack), the terminal can be used in the most diverse of work areas. When used for mobile weighing, the battery pack offers up to 70 hours of use per charge.

Together with all analog METTLER TOLEDO Ex weighing platforms (weighing range 3 kg–3000 kg) as well as weighing modules such as Centerlign or FlexMount® (weighing range 110 kg–20.4 t), the broad range of applications handled by the IND226x is bound to impress.

www.mt.com/hazardous-terminals
Reduce Production Losses and Equipment Downtime
With Cutting-edge Predictive Maintenance Technology

Having your scale terminal tell you that your load cell or scale is not in a healthy state could really help to prevent an off-quality batch production before it is too late. METTLER TOLEDO’s TraxEMT™ has features to allow weighing to continue at an acceptable accuracy until a cell replacement or repair is made, and eliminates costly batch wastage and reduces downtime.

Causes and effects of weighing system failures
When a weighing system is no longer weighing accurately it is usually due to mechanical influences on the weighing structure or load cell deficiencies. Possible causes of weighing system failures can be shock, overloading, mechanical damages, electrical surge, moisture, dust or extreme temperatures. Typical failures of a weighing system are non-linear or non-repeatable measurement, load cell signal drift, load cell cable short or damage, junction box malfunction or total load cell signal loss.

Effects of weighing system failures are huge. If the failure is detected, production facilities face shut-downs and associated expenses due to questionable quality of the batch, wasted material, costly reworks and delivery delays. If the failure remains undetected, unsafe operating conditions, inaccurate batches and inconsistent quality, over- and under-filling are caused.

This presents a more undesirable scenario where higher costs and risks are unaccounted for.

Maintenance and repair practices
Today approximately 70% of the maintenance and repair practices are reactive maintenance. Troubleshooting, repair and replacement of equipment in the event of failure cause high risk of prolonged downtime and expensive repair costs. 25% is preventive maintenance meaning that the equipment is serviced on a routine schedule to avoid performance degradation that can occur over time. With every service interval, production time is lost, the service department invests valuable time and expensive critical parts may be replaced. Just 5% use real-time system monitoring technologies to determine the equipment’s condition while in operation and predict failures.

Implementing an effective maintenance strategy that includes predictive maintenance can help to reduce unnecessary high maintenance and production costs. TraxEMT™ (Embedded Maintenance Technician) the predictive maintenance technology from METTLER TOLEDO allows you to run your process and plant efficiently and perform maintenance when necessary to a specific component(s) prior to its failing.

Predictive failure analysis
In a conventional multiple load cell weighing system, each cell’s signal is summed at the junction box and the compounded result is converted from analog to digital only at the weighing terminal. If one of the cells fails, it usually goes undetected until a periodic calibration, or through customer complaint saying that the product is defective. With a TraxEMT™ enabled weighing terminal, condition parameters that control the real-time monitoring of every individual load cell sensor in a weighing system can be programmed to predict and detect for failures. The embedded maintenance technician TraxEMT™ technology utilizes individual cell diagnostics facilitated by the RAAD (Remote Adressable A/D) smart load cell junction box. If a sensor is starting to fail, the system immediately informs for corrective action before the production is compromised and saving from reactive repairs to the equipment.
The basis for error or failure detection is:

- Load cell zero drift: in an error condition, the weighing system may experience a fair amount of a load cell signal drift from the original calibrated zero point.
- Load cell overloads: frequent overloading would lead to failure and an individual load cell may be overloaded simply with off-center load placement.
- Asymmetrical load distribution: in an error condition, a multi-cell weighing system may experience a significant difference to the percentage load distribution on each cell despite the load being applied in a repeatable manner from zero to full scale.

TraxEMT™ monitors and compares the zeroed off amount of each cell against the calibrated zero value, detects individual cell overloads or over-range condition when it compares the cell’s measurement against a cell overload threshold value and constantly surveys the percentage change of the load distribution ratio for each cell.

Accessing failure and diagnostics information

The IND780 advanced weighing terminal with TraxEMT™ combined with the RAAD Box™ technology allows:
- Continuous individual cell diagnostics
- Automatic alerts for scale/cell errors via email
- Calibration expiration management
- Scale calibration verification

This helps you to save time and costs by eliminating long hours of troubleshooting in a multiple cell system and having full control of maintenance schedules.

Example of a statistics

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Weigh</td>
<td>690240 kg</td>
</tr>
<tr>
<td>Scale Under Range</td>
<td>4</td>
</tr>
<tr>
<td>Scale Overloads</td>
<td>1</td>
</tr>
<tr>
<td>Zero Commands</td>
<td>3</td>
</tr>
<tr>
<td>Zero Command Failures</td>
<td>2</td>
</tr>
<tr>
<td>Zero Command Failures</td>
<td>66%</td>
</tr>
</tbody>
</table>

TraxEMT weighing systems alert and inform the users of different potential failures and errors through various interfaces.

System failure recovery

In the event of a specific cell failure, IND780 TraxEMT™ weighing terminal can take control to allow the weighing process to continue within user accepted tolerances (not for Weights & Measures approved applications).

The embedded ‘Run Flat’ algorithm compensates for the failed cell’s erroneous readings until the cell can be physically replaced or fixed. Run Flat performance is typically dependent on the:
- Configuration (e.g. number of cells) and structure of the scale
- Substance weighed
- Loading pattern

You now have the option to reduce costly batch in-process wastage and prevent an operational downtime.

Key customer benefits of TraxEMT™:

Centralized asset management and predictive maintenance help to achieve cost savings in these areas:
- Minimize unscheduled production downtime. Potential system failure is alerted ahead of time to avoid unexpected shutdown. Run-flat cell recovery to allow batch process to continue if deemed appropriate.
- Maintenance. Equipment is only serviced or repaired when necessary to it failing saving huge maintenance costs and time.
- Diagnostics and repair. Intelligent individual cell diagnostics and centralized information access reduces human diagnostics efforts to recover operations.
Bench and Mobile Weighing
For Your Routine Applications in Dry Areas

The BBA221 is a scale for your routine applications in dry areas, such as your receiving department or warehouse.

The terminal with its large display is fast and easy to operate. The scale offers over/under checkweighing, portioning, classifying and counting functions. It features a RS232 interface to cover your data communication needs. Furthermore, it is powered either by 4-C size batteries or optionally by a rechargeable battery pack, which enables the scale to be used flexibly across the whole premises.

Choose from a wide range of accessories: roller track, ball platter, stand or wall fixture for the terminal. The 500 × 650 mm and 600 × 800 mm size weighbridges can also be mounted on a cart and used as mobile scales.

Easy to operate
For manual portioning or checkweighing applications the BBA221 features a straightforward and easy to handle threshold definition system. Activate the application by F function key, store the target weight as well as the predefined tolerances and you are ready to go.

Automatic taring allows operation without pushing the tare button. After placing the empty container on the weighing platform, the weight is automatically saved as the tare weight (net indicator appears), this allows fast and time-saving operation and also results in less failure.

The weight value
For higher precision measurements the terminal features a ×10 function, which displays the received value with a higher resolution (×10) for approximate 20 seconds (not Weights & Measures approved).

Key benefits and facts BBA221
- Easy to perform accurate checkweighing, portioning and classifying measurements
- Weighing range 6 to 300 kg or 13.0–660 lb
- Max. Resolution: 30 000d, OIML 3000e NTEP 5000d
- Fast indication of the weighing result on the big LED display (< 1 s)
- High mobility due to integrated 4-C size batteries or optionally a rechargeable battery pack and cart
- Standard RS232 Interface
- Rugged, painted carbon steel platform with 4 integrated overload stops
- Optional: Stainless steel terminal (IND226), internal rechargeable battery pack, cart, roller track, ball platter

Stands: carbon or stainless steel (300, 600, 900mm)
Detection of Smaller Metal Contaminants Gives Bulk Product Manufacturers Peace of Mind

METTLER TOLEDO Safeline’s new RB Series Signature metal detectors overcome the inspection challenges posed by large bulk products including large bags and sacks of powdered material by offering a significant improvement in sensitivity levels over existing technology.

The challenges of bulk products
Bulk products pose two main problems for traditional metal detection systems:

1. The increased aperture height required to accommodate larger products passing through the metal detector leads to a reduction in sensitivity.
2. Bulk products can create product signals capable of concealing metal contaminants or leading to false triggering of the metal detector.

The RB Series solution
The RB Series metal detector combats these problems by utilizing a new coil design and advanced filtering techniques, enabling it to deliver unparalleled detector sensitivity for large, bulk pack products.

Maximized detection performance for complete peace of mind
This new technology provides the ability to detect all metal contaminants to previously unmatched levels in large aperture detectors. Non-magnetic stainless steel contaminants of less than 1.8 mm diameter can be readily detected in a typical 50 kg sack of dry powdered product. High moisture content products can transmit a large ‘product signal’ making the detection of metal contaminants concealed within them very difficult using traditional metal detection techniques. RB Series detectors can deliver significant improvements in detection sensitivity on moist products.

Customized to meet your needs
Single frequency models are available to cover the inspection of a range of similar products, while dual frequency models can cope with the inspection of different products and/or packaging types, providing a future-proof metal detection solution.

RB Series Signature metal detectors are available in a range of sizes, sealing standards and finishes to suit all manufacturing environments. Sealing standards are available from IP65 for dry, non-aggressive plant conditions through to IP66+ for harsh and heavy wash down environments.

For more information about the new RB Series metal detector, please contact your local METTLER TOLEDO sales organisation.

www.mt.com/pi
A Wide Range of Solutions to Improve Processes

1. Wash down net content control: IND469rem/KA3s
2. Vehicle weighing terminal and load cells
3. Floor scale for dusty and humid areas: PFA575
4. In-line pH and turbidity sensors

Share Our Knowledge

Learn from our specialists – our knowledge and experience are at your disposal in print or online.

Learn more about all of our solutions for the bulk food industry on our website. You can find information on a wide range of topics to improve your processes, including case studies, application stories, return-on investment calculators, plus all the product information you need to make an informed decision.

Brochures/Catalogs:
1. Brochure: Process weighing
2. Brochure: Predictive Maintenance
3. Weighing Components Catalog 2008
4. Industrial Weighing Catalog 2008

Mettler-Toledo AG
CH-8606 Greifensee
Switzerland
Tel. +41 44 944 22 11
Fax +41 44 944 30 60

www.mt.com/ind-bulk-foods

Your METTLER TOLEDO contact: