

The background image shows a large industrial grain processing facility. On the left is a large, cylindrical grain silo with a corrugated metal exterior. To its right is a tall, complex metal structure with multiple levels, stairs, and walkways, likely a grain elevator or processing tower. A smaller, vertical metal silo in the foreground has a sign that reads "PROUDLY BUILT BY ALLIED GRAIN SYSTEMS". The sky is clear and blue. A purple geometric overlay is on the left side of the image.

ALLIED

GRAIN SYSTEMS

BULKWEIGHER

The background image shows a large industrial grain storage facility with several tall, cylindrical metal silos. A tall, lattice-structured tower stands between two of the silos. The silos have "mfs" and "ALLIED GRAIN SYSTEMS" logos on them. In the foreground, there is a field of harvested grain, possibly corn, with a small white control building visible. The entire image has a purple gradient overlay.

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ACCURACY AND SIZES

Allied Grain Systems provides accurate weighing of free flowing bulk materials through our bulk weighers. Our bulk weighers are designed and manufactured to have dependability and durability to have an extensive lifetime.

We consider the requirements for each application and tailor-make a solution to suit the needs of each client. We all variables, from capacity requirements, location requirements, materials that will be handled, environmental requirements, service needs, and clean out solutions. Each bulk weighing system undergoes extensive testing to ensure that it will perform at the highest level for both in coming and out going product weighing.

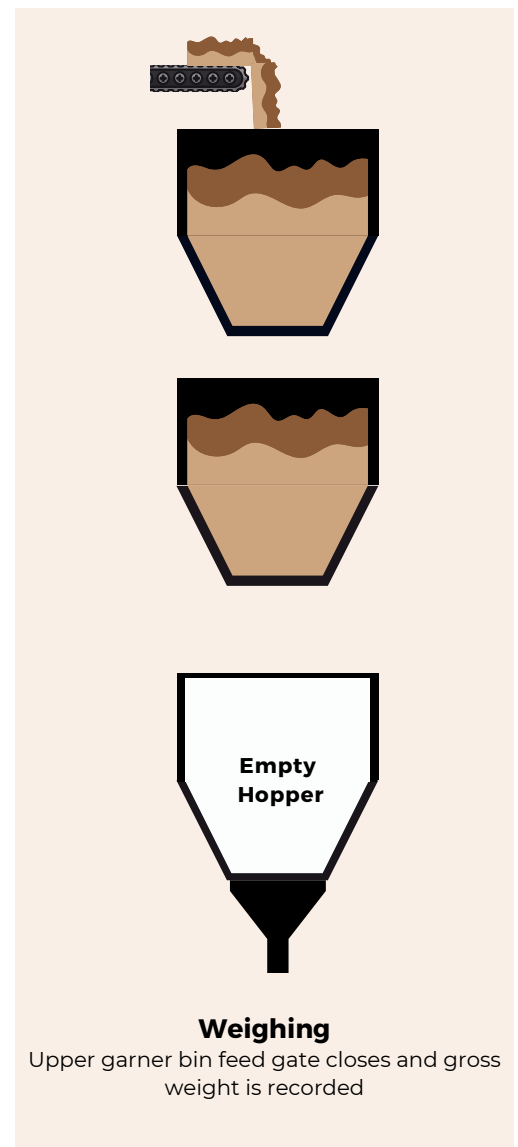
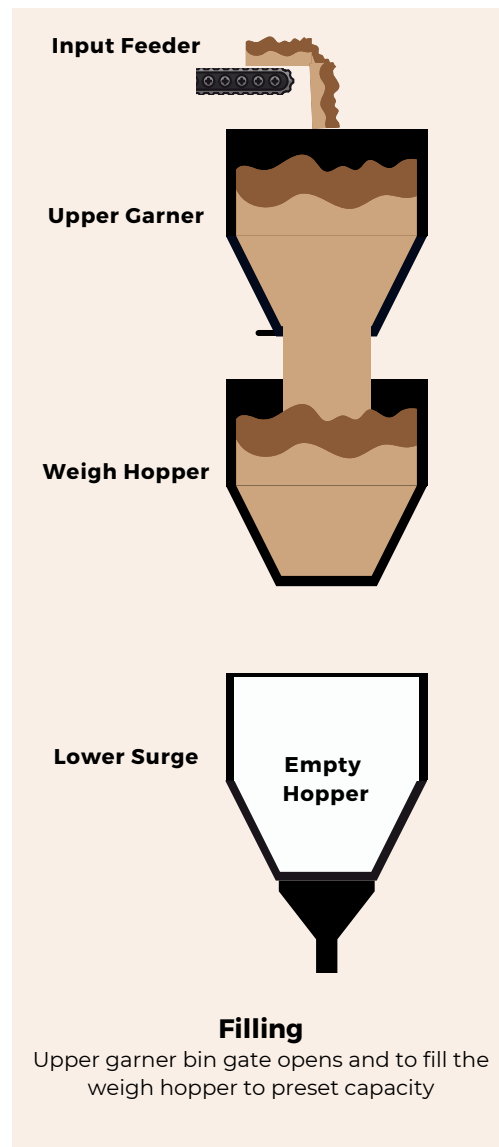


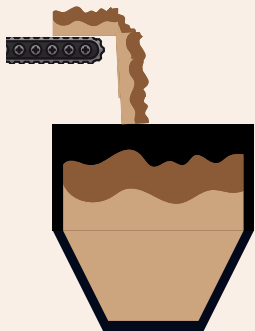
Allied Grain System bulk weighers have a continuous flowing system that can be used to weigh free-flowing material with an incredible accuracy of 0.1% and we offer solutions that range from 20TPH up to 2,000TPH.

Allied Grain Systems ensures that 'custom built' is standard and display a willingness to change in order to meet the requirements of your specific needs with a solution. Behind our products is a team dedicated to improvements to promote efficiency and keep at the forefront with all the changes in industry regulations.

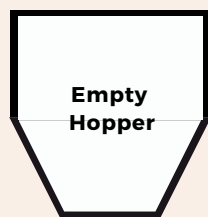
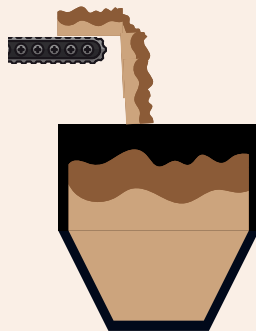
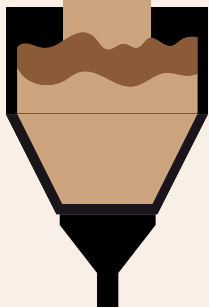
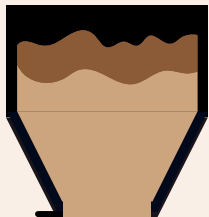
Systems Features: 4-load cell design, ladder style gates, and access doors and platforms at key locations. Operation are available as hydraulic, pneumatic, or electric. Optional equipment includes service platforms, test weights, auto life systems, control gates, power units, and inline voltage regulators.

BASIC BULK WEIGHER OPERATION

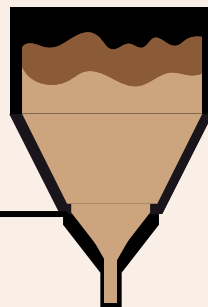


**Discharging**

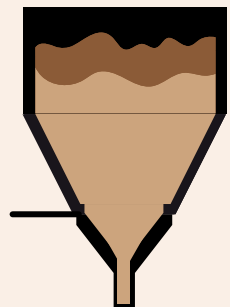
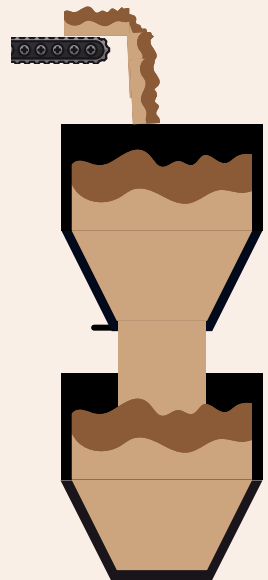
Weigh hopper bin discharge gate opens to fill lower garner bin



Empty
Hopper

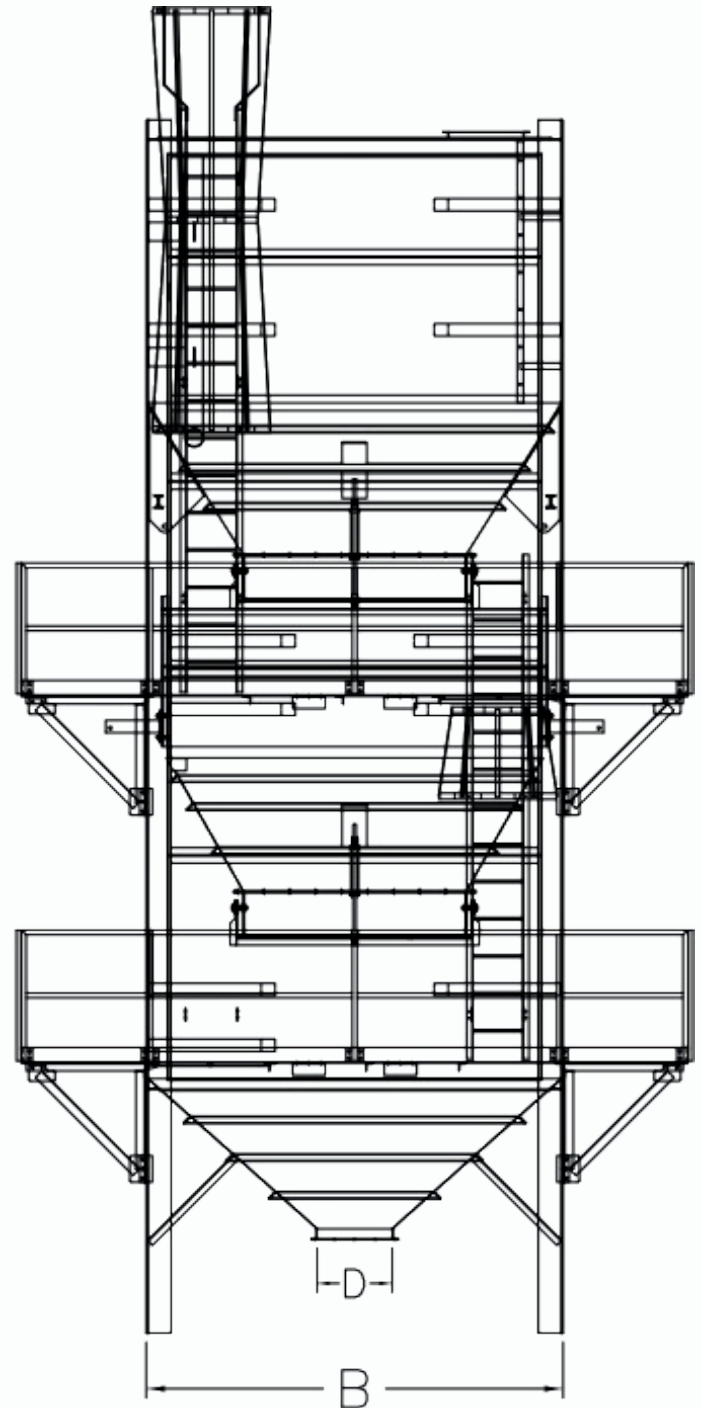
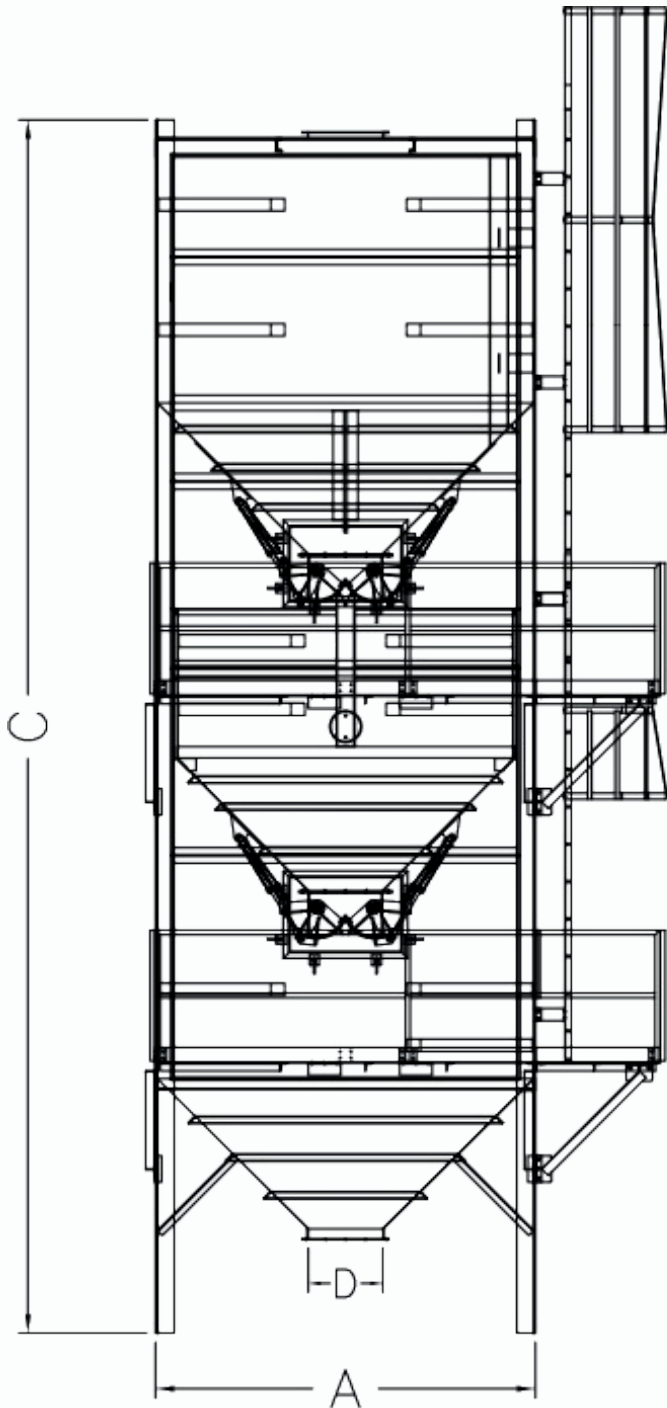
**Weighing & Recording**

Weigh hopper bin discharge gate closed and tare weight recorded
Bottom garner continues constant product flow.

**Cycle Continues**

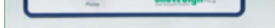
Filling cycle continues until the pre set weight is achieved. Operator can decide to go to another rail car or stop

BULK WEIGHER SPEC SHEET



Capacity	Draft							Cubic Metre			Shipping		Live
T.P.H	Size	A (M)	B (M)	C (M)	D (M)	UG	WH	LG		Weight (T)		Weight (T)	
136	81.6	1.8	1.8	4.4	0.3	4.1	1.5	1.6		3.9		9.8	
272	136	1.9	2.2	6.9	0.4	6.2	3.7	4		5		16.1	
544	272	2.2	2.5	6.6	0.5	8.5	4.7	5.2		6.8		22.7	
816	408.2	2.5	3.1	8.7	0.6	21	10.2	11		8.2		41.2	
1089	544.3	3.1	3.4	9.9	0.6	27.9	14.8	16.7		10.4		60.8	
1089 Extended	544.3	3.1	3.4	12.2	0.6	56.6	14.8	16.7		12.9		63.3	
1361	680.4	3.1	3.4	11	0.6	33.4	17.7	22.9		11.8		72.3	
1361 Extended	680.4	3.1	3.4	12.2	0.6	45.9	17.7	22.9		13.6		85	
1633	870.9	3.4	3.4	12.2	0.8	46.6	21.9	23.4		14.5		92.1	
2177	1088.6	3.7	3.7	12.2	0.8	64	27.2	27.5		15.9		104	
2177 Extended	1088.6	3.7	3.7	15.2	0.8	104.8	27.2	27.5		29.5		146	

Nominal TPH	139	278	556	833	1111	1111	1389	1667	2222	2222	2778
Nominal Bushells Per Hour	5000	10000	20000	30000	40000	40000	50000	60000	80000	80000	100000
Model	CA1000-5k	CA1000-10k	CA1000-20k	CA1000-30k	CA1000-40k	CA1000-40k extended	CA1000-50k	CA1000-60k	CA1000-80k	CA1000-80k extended	CA1000-100k
Class	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Max Capacity kg	1400	2300	4500	6900	9000	9000	12000	15000	19000	19000	25000
Min Capacity kg	500	1000	1000	2500	2500	2500	2500	2500	5000	5000	6667
Min Totalised load kg	1000	1500	2000	5000	5000	5000	5000	10000	10000	10000	13333
Totalised Scale Interval	1	2	2	5	5	5	5	10	10	10	10
Number of Load cells	4	4	4	4	4	4	4	4	4	4	4
Load cell model	Mettler Toledo SLS510										
Load cell Capacity kg (each)	500	1000	2500	2500	5000	5000	5000	5000	7500	7500	10000
Total cell capacity kg	2000	4000	10000	10000	20000	20000	20000	20000	30000	30000	40000
Target Discrete load kg	1361	2268	4536	6804	9072	9072	11340	11340	18144	18144	25000
dead load (Weigh Hopper and Gate)	400	682	968	1141	1792	1792	2220	2439	3019	3019	3508



1. *Journal of the American Medical Association*, 1997; 277: 1039-1043.

Precise, Fast Automation Loading and Unloading

Maximize Your Load and Attain Target Weight Precision

Precise control of hopper system, order processing features to prevent discharge of grain, minimal operator intervention improved turnaround times.

Rapid Draft Cycles and Elimination of Tramming

Save Time and Keep Your Operations Moving

Reduce cycle time with a OneWeigh controller and eliminate timing with continuous automatic adjustments. Draft size is adjusted with every draft. This eliminates minimum last draft size requirements of older systems.

Free up operator with minimal monitoring needs.

Rely on the RFID-enabled oneWeigh system to start loadout, calculate target weight, finish order, and print the weight certificate.



METROLOGICAL REQUIREMENTS

Accuracy Classes

Instruments are divided into four accuracy classes as follows:

0.2 0.5 1 2

Maximum Permissible Errors

Automatic Weighing

The maximum permissible errors for each accuracy class shall be the appropriate values in table 1 rounded to the nearest totalization scale interval. Maximum permissible errors apply to loads not less than the minimum totalized load.

Table 1

Accuracy class	Percentage of the mass of the totalized load	
	Initial verification	In-service
0.2	± 0.10 %	+0.2 %
0.5	± 0.25 %	+0.5 %
1	± 0.50 %	+1.0 %
2	± 1.00 %	+2.0 %

Influence Quantities

The maximum permissible errors applied in tests to assess the effect of influence quantities shall be as specified in Table 2.

Table 2

Maximum permissible errors	Load (m) expressed in totalization scale intervals
± 0.5 dt	+0.5 %
± 0.10 dt	+1.0 %
± 1.5 dt	+2.0 %

Digital indications and printed results be corrected for the rounding error, and the error shall be determined with an accuracy of at least 0.2 dt.

Form of the Scale Interval

The scale intervals of the indicating and printing devices shall be in the form of 1 10k, 2 10k, or 5 10k, "k" being a positive or negative whole number or zero.

Totalization Scale Interval (dt).

The totalization scale interval shall be:

- No less than 0.01% of maximum capacity, and
- Not greater than 0.2% of maximum capacity.

Minimum Value of minimum totalized Load (min).

The minimum totalized load shall not be less than:

- The value of the load for which the maximum permissible error for automatic weighing on initial verification is equal to the totalization scale interval (dt), and
- the minimum capacity (min).

Note: It results from the first indent above the maximum permissible error on initial verification (mpe in the following example) for a load equal to min shall not be less than dt.

Therefore, using Table 1 min shall not be less than:

- 1,000 dt for class 0.2 instruments
- 400 dt for class 0.5 instruments
- 200 dt for class 1 instruments
- 100 dt for class 2 instruments

Example:

Maximum capacity = 1,000kg

Minimum capacity = 200kg

Totalization scale interval = 0.2 (see **Totalization Scale Interval** above)

Accuracy class of the instrument = 0.5

Min $400 \times 0.2 = 80\text{kg}$

But to satisfy the second indent above:

Min Min = 200kg

Therefore, in this example the the minimum value of the minimum totalized load is 200kg

(The values used in this example are not intended to be typical).

Agreement Between Indicating and Printing Devices

For the same load, the difference between the weighing results provided by any two devices having the same scale interval shall be as follows:

- Zero for digital indicating or printing devices;
- Not greater than the absolute value of the maximum permissible error for automatic weighing for analogue devices.

Influence Quantities

Static Temperature

Instruments shall comply with the appropriate metrological and technical requirements at temperatures from -10°C to +40°C

For special applications, however, the limits of the temperature range may differ from provided that this range is not less than 30°C and is specified in the descriptive markings.

Instruments shall be tested in accordance with the static temperatures tests in A.8.3.1

Mains Power Supply (AC)

Instruments that are powered by an AC supply shall comply with the appropriate metrological and technical requirements when operated under variations of voltage from -15% to +10% of the value marked on the instrument.

Instruments shall be tested in accordance with the mains power supply (AC) test in A.8.3.3

Battery Power Supply (DC)

Instruments that are powered by a DC supply shall comply with the appropriate metrological and technical requirements in accordance with 4.3.8

4.3.8

An instrument that operates from a battery power supply shall, whenever the voltage drops below the manufacturer's specified value, either continue to function correctly or automatically be put out of service.

Instruments shall be tested in accordance with the battery power supply (DC) test in A.8.3.4

A.8.3.1 Static Temperature Tests

Static temperature tests are carried out according to basic standard IEC publication 68-2-1 (1990) and IEC publication 68-2-2 (1974) as according to Table 4.

Table 4

Environmental Phenomena	Test Specification	Test Set-up
Temperature	Reference of 20°C	
	Specified high for 2 hours	IEC 68-2-1
	Specified low for 2 hours	IEC 68-2-1
	5°C	IEC 68-2-1
	Reference of 20°C	
Use IEC 68-3-1 (1974) for background information.		

A.8.3.3 Mains Power Supply Voltage Variation (AC).

Power voltage variation tests are carried out according to basic standard IEC Publication 1000-4-11 (1994) as according to table 5.

Table 5

Environmental Phenomena	Test Specification	Test Set-up
Voltage Variation	Reference voltage	IEC 1000-4-11
	Reference voltage + 10%	
	Reference voltage - 15%	
	Reference voltage	
Reference Voltage (rated voltage) shall be defined in IEC 1000-4-11		

A.8.3.4 Battery Power Supply Voltage Variation (DC).

Test Method: Variation in DC power supply. Where the EUT continues to operate below the stated battery volt-age, the following test shall be conducted using an equivalent variable DC power source.

NMI APPROVAL

NMI 6/14B/31
Rev 0



Australian Government
Department of Industry,
Science and Resources

**National
Measurement
Institute**

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/14B/31

Issued by the Chief Metrologist under Regulation 60 of
the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Allied Grain Systems Model CA1000-60K Discontinuous Totalising Automatic Weighing Instrument

submitted by Allied Grain Systems Pty Ltd
41 Rockdale Road
Young NSW 2594

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI R 107, *Discontinuous Totalising Automatic Weighing Instruments (Totalising Hopper Weighers)*, dated July 2004.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved and variant 1 – certificate issued	22/06/23

CASE STUDY: T-PORTS WALLAROO



Allied Grain Systems were contracted by T-Ports to design and construct the most modern, automated, cost effective and efficient grain storage and handling system to suit their application, located at Wallaroo, South Australia.

Features of the complex include

- Two fully sealed 10,000 Tonne silo
- 1,000 Tonne per hour intake system with dual road hoppers
- 1,500 Tonne per hour out-loading system to ship via 500m rock causeway
- Full Automation

Along with these features the system also features a 1,500 Tonne Bulkweigher with an extremely abrasive ceramic tile wear liner. The ceramic tile wear liner are installed at all of the heavy wear points to add longevity to the bulkweigher.

ABHR ARTICLE

Reaping the benefits of bulk weighers

Continuous bulk weighing systems offer grain handling facilities accuracy, reduced waste and improved operational performance, which is why Allied Grain Systems has started developing bulk weighers.



Bulk weighers are common in the United States.

IN THE UNITED STATES, BULK weighers are a common sight on grain handling facilities.

John White, managing director at Allied Grain Systems, wants to see them become more popular in the Australian market.

"Traditionally in Australia for out loading of grain from facilities, we use a garner bin positioned above ground on weight cells," he told *ABHR*.

"It's hard to get this type of system certified due to wind loading effecting on the side of the garner bin which effects the accuracy of the weigh cells.

"You have to load a truck and run it over a certified weigh bridge system to get similar levels of accuracy, which in some applications can add much more time and effort."

Most of the bulk weighers in Australia have been imported in the past. This is an expensive process, as often they are too large to fit inside a container and need to be shipped on open deck.

Allied Grain Systems decided to design and manufacture its own range of bulk weighers in Australia. The company's team worked closely with Mettler Toledo Australia for the weighing equipment of the bulkweigher system as Mettler Toledo components are used in

overseas models. The larger bulkweighers were designed and built in sections, to be delivered to site as a wide loads to be bolted together on site.

Ceramic tiles are installed at all of the heavy wear points to add longevity to the system, while hydraulic slide gates are selected to operate the continuous internal slide gates.

White said Allied Grain Systems can customise the design of the bulk weighers for applications between 50 to 2500 tonnes per hour.

"There are a lot of applications where bulk weighers can be installed, and we have the design skills to ensure each meets the client's requirements," he said.

"They're mainly used to accurately weigh the outloading of a commodity for record keeping but can also be used to deliver a preset amount of grain with incredible accuracy.

"The whole system is controlled by a programmable logic controller, which stores and saves weights automatically."

Allied Grain Systems performs 3D modelling with AUTOCAD to ensure the design will fit the application and ensure the towers are able to handle the associated loads.

It also provides full installation services and after sales support. While the bulkweighers themselves are reasonably low maintenance, the company can provide periodic preventative maintenance and provide test weights with the units so customers can calibrate at any time they choose.

White said the market for bulk weighers is growing fast.

"We have installed a few around the country and the feedback from customers has been very positive," he said.

"They've been trouble-free and work day in, day out to provide accurate measurements that can be relied on.

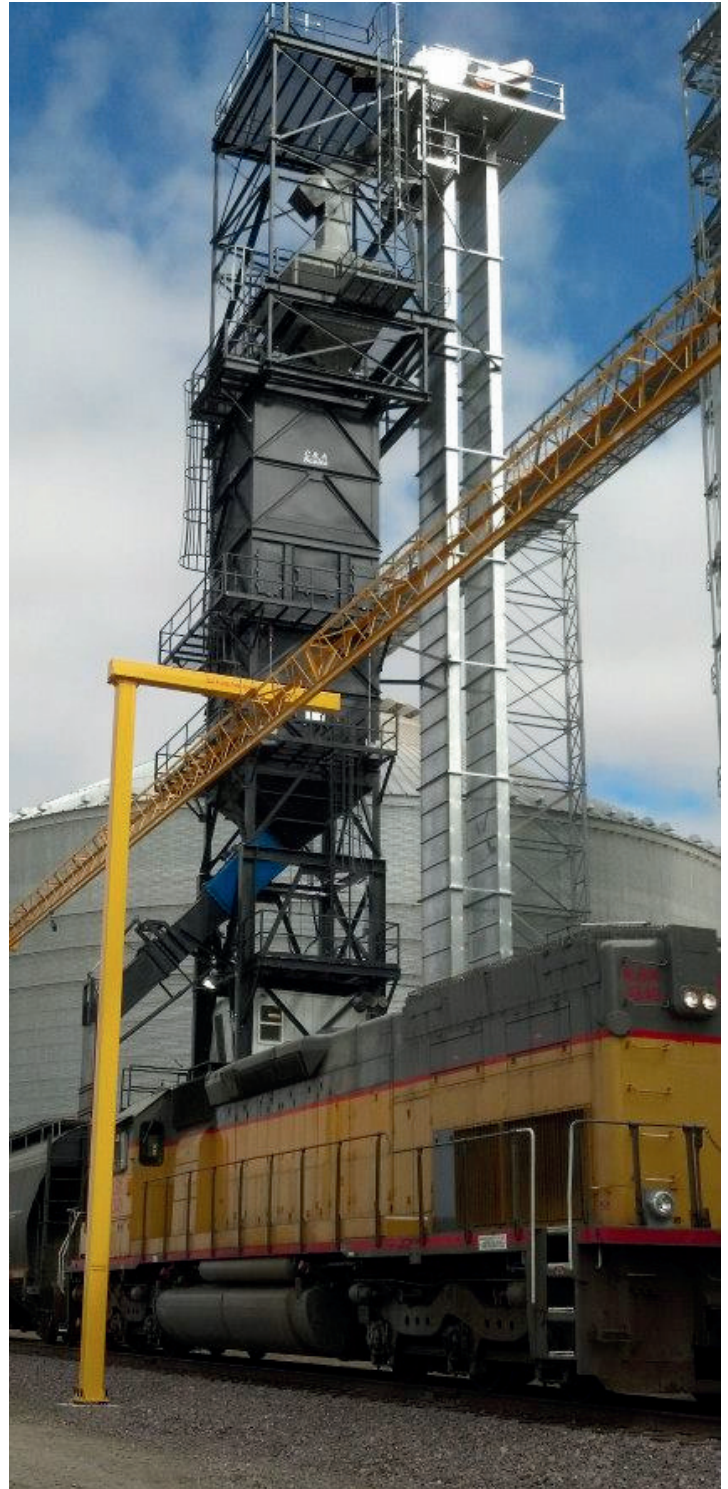
"We'd really like to provide more for the local market, which is why we aim to educate customers about these units and their benefits." **B**



The bulk weighers can be customised for applications between 50 to 2500 tonnes per hour.







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