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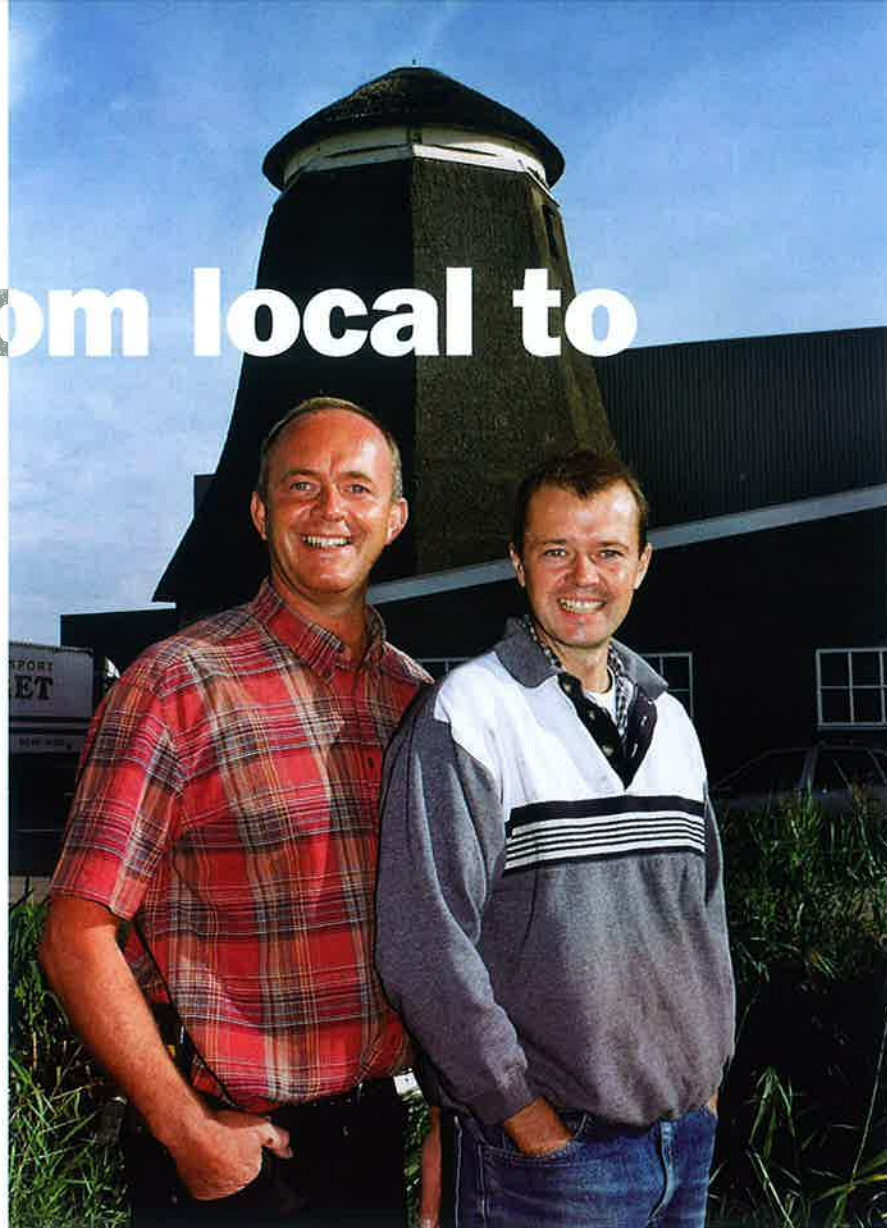
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# EMT: from local to global

We salute the enterprise and vision of **Gustaaf** and **Janco Zeeman**, the brothers who have transformed a local family business in North Holland into European Machine Trading (EMT) – a company with a true global reach.

*Gustaaf (left) and Janco Zeeman, the dynamic partnership behind the EMT team.*



The Dutch are renowned entrepreneurs, traders and travellers. Gustaaf Zeeman, Managing Director of European Machine Trading (EMT) is a modern exemplar of this fine tradition. In the space of barely 20 years, Gustaaf and his brother Janco have transformed their family shareholder business from one that was well known within the Zijpe region of North Holland to a company which now has a true global reach.

The Zeeman family can trace its roots in North Holland for over two centuries. Would those members of the family who set up the local agricultural merchandising company in 1908 have ever imagined that Gustaaf would be selling sophisticated computer-controlled, labour-saving and high-volume blending and bagging equipment to an ever expanding customer base in over 40 countries?

Gustaaf and Janco Zeeman have remained committed to their roots in the small town of t'Zand, and the original family business of N.J. Zeeman Diervoeders B.V. continues to serve the local farming community. This in turn has kept the broth-

ers well attuned to the needs of farmers, both close to home and further afield. N.J. Zeeman Diervoeders supplies a wide range of fertilizers in bulk and big bags, as well as liquid products, for use by both arable and livestock farmers. The company was an early supplier of blended fertilizers, which gave Gustaaf and Janco added insight into a sector that only began to take root in Western Europe during the 1980s. An early fertilizer blending installation used equipment bought from the long-established US producer, Doyle Manufacturing Co. of Quincy, Illinois.

The brothers were impressed by the capabilities of the Doyle blending unit, and in 1989, European Machine Trading was set up to import Doyle equipment to the fast-growing European market. The partnership has evolved as EMT developed a machine fabrication facility, which has enabled the company to perform as a producer of tailor-made equipment for individual customers as well as an importer of off-the-peg products.

The EMT portfolio has expanded to embrace the following sectors:

- Blending
- Big- and small bags
- Bag closing
- Handling equipment
- Transport systems
- Buildings
- Software.

EMT's growth has been steady during the past 20 years, evolving as the hardware has advanced and taking advantage of the rapid strides in control software technology. It is interesting to note how the US and European blending markets have developed along distinctly different lines during this period, very much reflecting different logistical and marketing scenarios. Within the past two decades, the European market has become more concentrated, leading to requirements for equipment with ever larger capacities, even bigger than in the United States. A typical EMT installation in 1990 had an average batch capacity of 30 t/h. Today, blending units of 100-120 t/h average capacities are the norm, while batch production has been largely superseded by continuous production, controlled by computers.

To date, EMT has supplied over 400 blending and bagging machines to customers in over 40 countries. Each one of these machines is customised for either the European or global markets and is supported by an after-sales and servicing network. EMT has its own R&D facility, where engineers design new machines or modify existing machines in accordance with customer requirements, using a 3-D CAD system. Swift delivery is ensured as EMT keeps a good stock of key parts.

EMT's story began with imports of the Doyle *Shamrock* drum blender and weigh hopper, and this equipment remains in popular demand. The stainless steel *Shamrock* blender is suitable for the production of powder and granular fertilizers, offering a capacity of between 20-60 t/h. Most of EMT's earliest installations remain in service, testimony to the soundness and durability of the original design.

Vertical blenders provide a compact alternative, employing a tapering auger with a width of 101 cm at the bottom and 55 cm at the top, thus providing optimal blending quality. The Vertical Blender is constructed of stainless steel and stands on four support legs and a mild steel frame. Beneath each leg is a stainless steel load cell. The unit contains a digital indicator and a large display. Capacity ranges from 25 to 45 t/h.

EMT markets the *Weighcont* (*weighing continuous*) continuous blender, comprising two or more stainless steel hoppers. This employs a continuous blending process, based on control by weight information. The computer controls the product flow via a variable speed mechanism. The raw materials are metered by stainless steel metering conveyors. Adjustment of the drive system is done by the computer, thus guaranteeing a continuous flow of materials through the conveyor at the required rate. The metering conveyor discharges the materials to a central transport conveyor. This conveyor discharges the materials to a central transport conveyor. This conveyor is automatically adjusting in speed, according to the fertilizer required. Capacity is up to 120 t/h. The machine is completely computer controlled, which gives an excellent overview over the formulations to be used.

In addition to the *Weighcont*, a cheaper machine has been developed. The *Volcont* continuous blender comprises two or more stainless steel hoppers. This employs a volumetric blending process, which the operator controls via a variable speed mecha-



## A new home for Old Glory

EMT's home base is the North Holland community of t'Zand ("The Soil"), within the Zijpe municipality. It is part of the world-famous tulip-growing heartland of the Netherlands – a classic landscape of open fields, waterways and windmills that every spring draws visitors from far afield. Many of the mills continue to fulfil their original purpose of keeping the polders drained, but for grinding the corn, wind power has been superseded by modern technology. One legacy of the corn-milling era is to be found at the EMT site in t'Zand: the tower of a mill that was known to be operational as far back as 1631.

Nicknamed *Old Glory*, the mill has been in the Zeeman family ownership for more than a century. It is built in the traditional North Holland style, with a substantial octagonal wooden frame covered in thatch. The mill supplied the local bakers with wheat for many generations, but the Industrial Revolution eventually caught up with milling technology in the early decades of the 20th century. Milling continued at the site, but diesel and electric power replaced the vagaries of the wind to grind the corn, prompting the removal of the sails. Economies of scale in milling and transportation in turn prompted the

erection of modern mills further away, and in due course, the Zeeman family decommissioned the mill and used it for storage.

In 2004, Jaap Zeeman – father of Gustaaf and Janco, and now retired from the family business – turned his attention to restoring *Old Glory* to its full status as a fully functioning corn mill. It was decided this could be best achieved by relocating the mill away from the busy EMT premises, where it could be better enjoyed by tourist visitors.

By 2007, Jaap Zeeman had found an appropriate site, on the outskirts of t'Zand, and the parcel of land was duly acquired and landscaped. Preparations are now being made to make the very delicate move of the old tower, which is scheduled for later this year.

As a first stage in the restoration project after the mill has been re-erected at its new site, a small museum will be created at the base of the mill tower. Stage II involves the restoration of the sails and the installation of the milling machinery. In not too many years hence, *Old Glory* will be back in action, offering a warm welcome to visitors and giving them the chance to see how flour was once produced – a living memorial to the enterprising and hardy people of North Holland. ■

nism. The raw materials are metered by stainless steel metering conveyors. Adjustment of the drive system is done on the electrical panel, thus guaranteeing a continuous flow of materials through the conveyor at the required rate. The metering conveyor discharges the materials to a central transport conveyor.

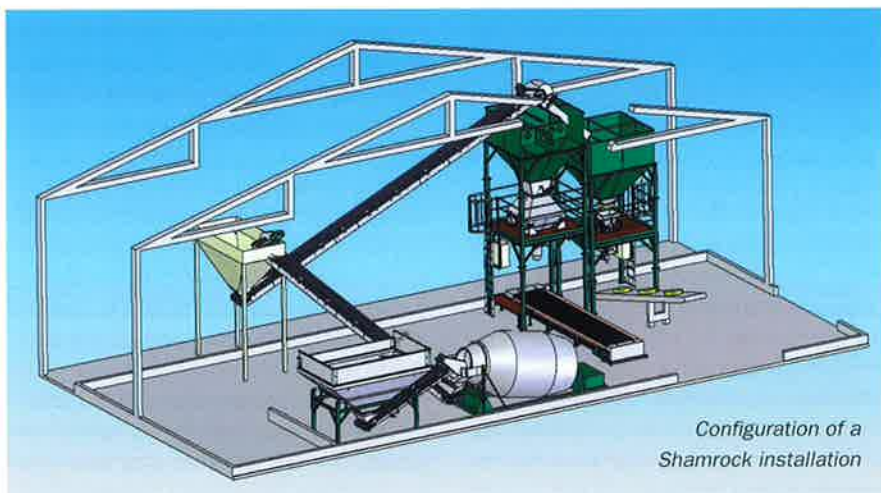
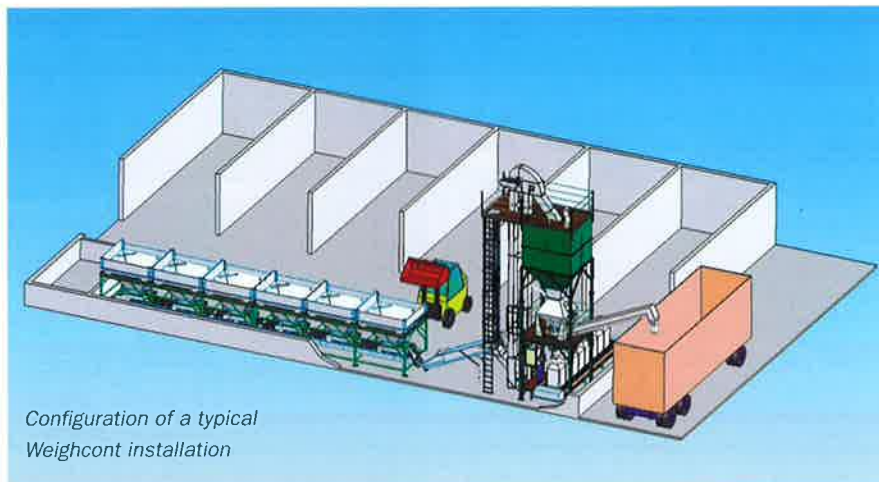
EMT supplies the *Smithbuilt* open top blender. This is suitable for granular fertilizer production and has been designed for low-volume output in areas of restricted space. It incorporates a round internal blending baffle for an optimal blending flow. The auger inside the blender is made of mild steel and is placed in a stainless steel tube. Capacity is 10-30 t/h.

The *Kraus/Tyler* blender is suitable for producing powder and granular fertilizers, processing all the raw materials into a top-quality blend. It employs a steel stirring arm on which paddles are connected, rotating at the rate of five times per minute. A motor gearbox drives the stirring arm. The blending process takes three minutes. The whole blending unit stands on four load cells within a mild steel framework. The

drops into the bag, and as soon as the bag is filled, the clamp releases the full bag on to the conveyor that transports it to the sewing or sealing machine. The *Small Bag Single Unit* has a capacity of 400 bags/hour for open-mouth bags, and 300 bags/hour for valve bags. In addition, EMT offers the *Small Bag Single Compact Unit*. This has been designed to have a machine that can be installed in small places.

tems is 30 t/h with bags of 1 tonne, and around 40 bags/hour with 500 kg bags.

The *EMT Big Bag High Speed Unit* is an automatic system that automatically weighs and fills Big Bags of between 100 kg and 1,250 kg. The weigh scale hopper unloads into a stainless steel pipe which fits into the Big Bags. The bags are held up and closed around the filling pipe by the clamp system, thereby avoiding any prob-



blending capacity of the Klaus/Tyler blender is between 30-40 t/h.

## Integrated facilities

Allied to the wide range of blending machines that are tailored to meet customers' marketing needs is a comprehensive range of bagging machines. For smaller-scale producers, EMT offers the *Small Bag Single Unit*. This is an automatic bag fill system that fills bags from 15 to 50 kg in size. The complete unit operates fully automatically by means of a weighing indicator. The weighed product automatically

The *EMT Small Bag Double Unit* is tailored for 15-50 kg bags and operates on similar principles to the Single Unit, with pairs of bags being filled side-by-side. It has a capacity of 800 bags/hour for open-mouth bags and 300 bags/hour for valve bags.

The *Big Bag Economic and Low Profile Unit* is an automatic system bag-filling system suitable for FIBC bags (Flexible Intermediate Bulk Containers or "Big Bags"). The *Big Bag Economic* is a fixed machine with a hopper storage above it, while the *Big Bag Low Profile* is a portable machine which can be moved by a fork lift truck and filled by a loader. The capacity of both sys-

tems of excess dust during the filling process. The *Big Bag High Speed* has a capacity of 100-120 bags of 500 kg/hour and 50-70 bags of 1,000 kg/hour.

The *EMT Big/Small Bagging Combi* provides the flexibility to fill Big Bags as well as small bags of 25-50 kg. This is achieved through a unique load cell construction which detects the size of bag being filled. The unit has a changeable filling pipe for FIBCs and a changeable filling mouth for the 20-25 kg small bags. These filling mouths can be removed and exchanged for each other. The electrical system works with connectors to plug in from one to the other bag filling system. The entire change-over can be undertaken in just 5 minutes. The capacity for small bags is 800 bags/hour while Big Bags can be filled at a rate of 30 bags/hour for 100 kg bags and 60 bags/hour for 500 kg bags.

The *Portable Container FIBC Big Bag* filling system has a capacity of 150 t/h and is a very compact installation, being fully integrated within a 6 m (20 ft) container. The system is fully portable, fitting into two 20ft containers, and consists of a stainless steel fill elevator, two weighing scales under the hopper. These scales discharge the product directly into the FIBC Big Bag. The container body is made of mild steel, while the elevator, storage hopper, weigh

scales and fill pipes are constructed from stainless steel 304. The unit operates with a Siemens control PLC and Salter Weightronix weighing indicators.

The *Triple Portable Container* has a capacity of 70 t/h, and is likewise easy to install, while offering flexibility of location and a compact design. The system consists of a single weighing scale in the middle container and a weighing slide that discharges the product directly into the Big Bag.

For bag closing, EMT offers various sewing machines. These are for bag closing. EMT offers different types of closing devices, depending on customer needs. The sewing machines that EMT offers are *Fischbein*, *New Long* and *Union Special*. For sealing, EMT uses grip seal machines of Audion or belt continuous seal machines from Saxon or Raak.

Conveyors are a key element in any integrated blending and bagging operation. EMT offers a comprehensive range, including the Big Bag Conveyor. This is a horizontal wooden chain conveyor that transports the FIBCs. This is a top-quality piece of equipment, and the beams are made of hard tropical wood (Bankirai). It may be used in conjunction with a Big Bag high-speed bagging line.

EMT has designed a stainless steel vertical elevator, with a height ranging from 3 m up to 35 m. An intake hopper is used to fill the elevator, which has a capacity of between 20 t/h and 250 t/h. Another conveyor type in the EMT portfolio is the Transport Conveyor. This is suitable for transporting both powder and granular materials for discharge into hoppers at a rate of up to 160 t/m<sup>3</sup> per hour.

## Advances in software

Computer programming software is now an integral part of modern fertilizer blending operations and has been instrumental in enhancing the bond between supplier and buyer. As Gustaaf Zeeman noted, "The help of a computer program can give you indispensable support to your customer. The information that you supply your clients is made more reliable and you can support the advice to your client very well, encouraging mutual trust between you and your customer." Optimisation of the blending process enables the supplier to offer top-quality advice, not only in agronomic terms but also economic, as the farmer makes the most financially effective use of his inputs.

"Blending and optimisation are closely

connected to each other," Gustaaf said. "If you want to use your blender and provide good advice to your customers, it is a must to optimise." The *Optiblend* program is a key tool in this respect, as it calculates the fertilizer blend for optimal results. *Optiblend* meets the following criteria:

- User-friendly operation
- Clear print-out operation
- A full database of information in the computer
- The software is fast-working
- The analyses meet government regulations
- The program connects with the dose system of the blending installation.

Optimisation in this way allows for very accurate compositions. The composition print-out shows the name of the customer, the acreage, the price of the blend, the type of fertilizer and weight, the analysis of the blend and the period of spreading. The result is a significant empowerment for the grower.

## Trends

Gustaaf Zeeman has been in the vanguard of the advances made by blending throughout Europe during the past two decades. In Western Europe, blending is now a mainstream activity, having been embraced wholeheartedly by the large-scale manufacturers who had previously resisted the concept. Most are valued EMT customers. Blending enables unique formulations to be produced for markets all over the world, which could not otherwise be undertaken by a traditional compound NPK fertilizer plant.

Blenders supplied by EMT have enabled farmers to enjoy improved economies of scale from their fertilizer inputs – a key factor as the trend in selling prices is downwards. The trend is steadily away from blanket applications of NPKs towards site-specific applications, increasingly with added micronutrients. Allied with agriculture's embrace of GPS technology within the past 10-15 years, blending has become an integral part of an increasingly high-tech business. The *Optiblend* program is a key part of these advances, providing immediate input from the farmer to the blending production facility.

Top: A small- and large bag installation in Ukraine.

Below: A Weighcont bascule installation in Belgium.



Other increasingly significant additions to the customised blend include sulphur and magnesium, as well as ammonium sulphate as an alternative source of sulphur. A popular source of Mg is kieserite, as marketed by K+S Kali GmbH. What we are witnessing, Gustaaf said, is the steady de-commodification of agricultural inputs at the application level. It is very clear too that farmers' knowledge levels about fertility and fertilisation are increasing.

Gustaaf keeps a close eye on the evolving scene in agriculture, not only close to home but further afield. He notes distinct patterns of development in various regions. Western Europe remains a core area for business, and many of the orders coming in are for replacement or enhanced equipment, offering much higher capacities. Further east in Europe, much of the business is entirely new. It is now two decades since the demise of the Soviet Union, but the

widespread shortfall in investment in the region is only now being overcome. Infrastructures in Eastern and Central Europe are generally sound, but at the farm level, equipment is often lacking or otherwise outmoded by comparison with the western continent. However, the region is now generating a healthy volume of business for EMT as farmers start to catch up with their Western European counterparts.

In Asia, plantation and cash crops are a driver, notably for fertilizer applications on oil palm. This region differs from Europe, because of the acidic nature of the soils and the humid conditions. The primary demand is therefore for granular and powdered fertilizers. Humidity and/or chloride attack on steel can sometimes be a limiting factor on the spread of blending technology in the region, but Gustaaf advocates keeping the machines clean as the key to ensuring their effective operation in a demanding environment. EMT also paints an extra layer on Asian orders to enable the equipment cope with the potentially corrosive conditions.

Gustaaf also reports that an increasing number of countries in Africa are now addressing long-standing soil fertility issues, and government initiatives have begun to encourage growers to increase their fertilizer applications.

EMT's current reference list covers 40 countries around the globe. Albania, Belarus, Burkino Faso, Cameroon, China, Egypt, Estonia, Ghana, Indonesia, Kenya, Malaysia, Nigeria, Sudan and Ukraine are just a handful of the countries where blending, bagging and loading equipment supplied by EMT can be seen in operation.

*How the EMT story began: THE Doyle Shamrock rotary blender.*



## The personal touch

Gustaaf has accumulated many stamps on his passport, but he says that the Internet has helped the business grow worldwide, helping to break down international frontiers. Advances in communications have helped accelerate the development of customer partnerships, helped by the EMT philosophy of looking for long-term solutions and forging close individual relationships: many buyers view Gustaaf as a good personal friend.

In today's 24/7 world, customers know that Gustaaf is just a phone call or email away if they need any diagnostics with operational matters that may arise. Gustaaf is the public face of a close-knit team at EMT. While he spends at least one day out of three travelling on the company's marketing business, his brother Janco stays closer to home, with specific responsibility for buying, long-term equipment development and after-sales. The balance in sales is steadily moving away from off-the-peg sales from stock and more towards the supply of customised facilities. Janco has harnessed the latest computer software for the manufacturing operation. Another member of the team is Arjan, a 3-D CAD expert, who is involved in designing new installations, regularly taking a radical approach towards streamlining the entire blending production, bagging and loading process. One of Arjan's current projects is an automated drum emptying unit.

EMT recently inaugurated a dedicated manufacturing facility at the t'Zand site. It impresses all visitors for being immaculate and well organised, with a ready stock of the standard components that are used in each customised order.

Gustaaf believes that fertilizer blending

is the right technology for the current farming environment. In effect, it enables concepts of just-in-time management – so widely employed in other industrial and distribution sectors – to reach the farm. Blending provides the farmer with an excellent tool for enhanced stock control and for making the most economic use of valuable input resources.

Blending offers increased advantages for the international trading companies, many of whom are now moving further downstream in the distribution chain and thus exerting a stronger influence. These companies have embraced just-in-time techniques as part of their risk management strategies: they are in a better position to absorb market ups and downs than the local buyers. The closer involvement of the traders has prompted a recent trend towards the installation of large-scale blending units, close to a port but near to an agricultural hinterland, and flexible enough to supply as many as 120 custom fertilizer blend formulations.

Big Bags have been the key to this greater market flexibility, and within the past 10-15 years, they have transformed EU fertilizer markets, prompting farmers to invest in the equipment to handle the FIBCs that provide a ready-made storage facility.

Gustaaf Zeeman believes that many African countries will eventually follow this evolving Western European model, with fertilizers shipped to or produced in bulk at the major harbours for bagging into FIBCs and then transported further inland, where the fertilizer can be blended close to the farmer. After blending, the fertilizer is bagged into 20-50 kg bags and sent to the final point of sale. The current limitation on such developments remains Africa's weak infrastructure.

Having been at the forefront of more than 20 years of radical change, how else does Gustaaf see the global market for customised blended fertilizers as evolving? He sees the current trend away from mechanical operations to computer controlled activities as continuing. The greater concentration of farms in Europe and elsewhere is also expected to continue, as further agricultural economies of scale are exploited. This in turn will mean consolidation among the suppliers, who will invest in larger warehouses and distribution centres. In order to keep close to the customer base, blended fertilizer formulations will be increasingly the norm – and Gustaaf Zeeman will be there to serve these needs. ■



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