



Clear. Clean. Tidy.

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MAN showcases vehicles, services, leasing and finance as integrated solutions for municipal applications at the IFAT 2016 trade fair.

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Clearing leaves from the street with the aid of a road sweeper,
collecting waste using a refuse collection vehicle,
removing containers full of recyclables using the roll-off skip loader -

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activities of this type depend on vehicles used in the waste disposal sector, road maintenance or for winter gritting and snow clearing. Flexibility, economy, environmental awareness, practicality, efficiency, reliability – these are just some of the high expectations municipalities and operators have of our vehicles. These criteria are the focus of the MAN stand at IFAT 2016. Our practical solutions can be found on the MAN stand at the world's leading trade fair for water, sewage, waste and raw materials management in Munich from 30 May to 3 June 2016.

Efficiency in operation and vehicle maintenance starts for the operator and municipality with the choice of tailor-made vehicle/body combinations: MAN offers an extensive range from 7.49 to 41 tonnes in the TGL, TGM, TGS, and TGX truck series. It is only through the close interaction of MAN chassis, the sector-specific bodies and the additional equipment that the efficiency features really come into play.

The four vehicles showcased at the MAN trade fair stand demonstrate flexibility through their combination with the body, environmental awareness as a result of the efficient Euro 6 emission control technology and economy thanks to a driveline designed specifically for sector requirements.

MAN Truck & Bus is one of Europe's leading manufacturers of commercial vehicles and supplier of transport solutions, with revenues of approximately €9 billion a year (2015). The product portfolio includes trucks, buses and diesel engines, as well as services related to passenger and cargo transport. A subsidiary of Volkswagen Truck & Bus GmbH, MAN Truck & Bus employs more than 35,500 people worldwide.



Flexibility – MAN TGM 13.250 municipal vehicle with interchangeable bodies

A road sweeper generally runs during the dry periods of the year. If snow has fallen, the vehicle, which is comparatively expensive in terms of procurement and maintenance, stands idle. A winter service vehicle with its spreader unit is generally only used for a few months of the year. A tipper, on the other hand, is used throughout the entire year for a variety of transportation tasks.

A typical road sweeper uses a 4x2 chassis, has a steering wheel on the right-hand side and requires space between the axles for attachments. Typical winter service vehicles and tippers are all-wheel drive trucks with the steering wheel on the left-hand side and a mounting plate fitted to the front for the snow plough. The implementation of the universal vehicle concept was also made more difficult due to the fact that the introduction of the required Euro 6 emission standard reduced the installation space on the frame.

The solution: One chassis - three tasks. This range of combinations delivers flexibility, efficiency and economy. The chassis is in operation around the clock which ensures a high level of vehicle utilisation for the operator and provides municipalities with a return on their procurement costs.

“We are showcasing a genuine all-rounder on our stand in the TGM 13.250 4X4 BL with swap body. This all-year-round operability represents significant added value for smaller municipalities in particular. This is where MAN's extensive experience in the municipal sector and their relationships with body builders really pay off. We always aim to find a solution both technically and within our service provision, which meets even the most demanding customer requirements,” explains Ann-Kathrin Kieler who has responsibility for municipal body builder management at MAN Truck&Bus.

As a swap body unit, the MAN TGM 13.250 4x4 BL all-wheel drive vehicle can accommodate a road sweeper or a tipper with a winter service spreader fitted. The innovation for the 2016 IFAT trade fair is MAN's ex-works vehicle preparation which allows bodies to be swapped quickly and easily. A road sweeper needs free installation space between the axles for the brush rollers, circular brushes and the suction shaft. MAN has therefore repositioned the Euro 6 exhaust system to include the exhaust pipe, compressed-air tank and battery box on a rack behind the cab. The diesel tank switches to the left-hand side which leaves space on the frame on the right-hand side for the sweeping unit. MAN provides a central tank for all



consuming units in each body in place of individual hydraulic fluid tanks. Space is also available for this on the chassis.

The all-wheel drive not only ensures forward propulsion as a tipper when travelling off road, but also in winter when clearing snow. It provides ground clearance available under the frame for sweeping and suction equipment. The scope of delivery includes the winter service equipment with front mounting plate in accordance with DIN 15432, lane speed signal for the spreader, raised lighting and turn signals and orange revolving beacon on the cab roof.

A speciality of the TGM series with gross vehicle weight of 13 to 15 tons and all-wheel drive is the standard air suspension of the rear axle. This makes the procedure of swapping between bodies that much easier. It ensures maximum protection of the load from bumps and keeps the driving level always the same. The advantage of the air suspension system becomes very apparent in the winter. Regardless of the load condition of the mounted spreader, the loading platform and spreading plate always remain at the same height. The spreading pattern does not have to be re-adjusted during the round once it has been set.

This combination of road sweeper, winter service and three-way tipper will be exhibited at IFAT using an MAN TGM 13.250 4x4 BL with two bodies in order to illustrate the flexibility of the vehicle operation. A Faun road sweeper body and a Meiller three-way tipper will be positioned behind the chassis. When operating as a road sweeper, the driver has the best view of the working area with a right-hand drive.

Automated gear changing when sweeping - new with MAN TipMatic

As an alternative, in the future MAN will also offer the MAN TipMatic automated gearbox with specific gearshift program for road sweepers in the TGL and TGM series with the 250 hp Euro 6 engine. This relieves the driver of the need to change gear. He is then able to focus on the traffic which is even more advantageous when street cleaning or clearing snow. The MAN TGM then moves at the usual speed of a truck between operation sites. The use of the rotary switch, easily accessible next to the seat, is straightforward: One turn selects forwards or reverse. An individual driving program is available for the road sweeper operation - this is labelled Ds.



Safe driving - ESP available for vehicles with all-wheel drive

From now on, MAN is offering ESP for two-axle municipal vehicles with optional all-wheel drive. The legislature only requires ESP for road chassis. However, tippers used for flexible operations in the builder's yard are often ordered with all-wheel drive in order to be able to complete work away from the road. Despite this, they spend most of the time travelling on sealed road surfaces. MAN's commitment to also install ESP in the all-wheel drive versions of the TGM and TGS series, is intended to further increase safety.

Practicality – MAN TGS 28.400, tailored to winter service

The three-axle MAN TGS 28.400 offers traction, manoeuvrability and efficiency, and its chassis configuration has been developed in close collaboration with users. MAN offers an ex-works all-wheel drive chassis with steered and lifting trailing axle. For sector-specific equipment in winter service, the customer no longer needs to involve a partner in making the conversion. The third axle, which is designed for a nine-tonne load capacity, increases the payload and body length which is a real benefit in terms of the quantities of grit that can be transported in winter service. The driver will appreciate the steered training axle which provides a high level of manoeuvrability for a vehicle of around 8.5 metres in length. A real feature of this design is the turning circle which is two metres less (17.3 metres instead of 19.3 metres) than a three-axle MAN TGS with driven tandem-axle assembly. Raising the trailing axle when unladen or with partial load reduces fuel consumption and tyre wear and thus contributes to efficient vehicle operation.

The scope of delivery ex-works also includes specific winter service additions such as front mounting plate and lighting, electrical interfaces for the body and for winter service hydraulic system and the preparation for fitting a camera, whose image feeds into the navigation screen in the instrument panel.

Public-utility vehicles need to be in operation throughout the year. This is because municipal and city yards, road and highway maintenance companies and their subcontractors clear snow, clean roads, and carry out repairs on the road surface, signs, and lighting, and also maintain the roadside greenery. MAN meets these requirements with vehicles from the TGL, TGM and TGS series with tipper body and winter service equipment,



to which a loading crane may also be added. Flexible conversion for tasks in both summer and winter is therefore also possible.

This MAN TGS 28.400 6x4-4 BL is shown with a chassis with winter service equipment without body in order to display the sector-specific configuration.

Economy– MAN TGS 32.360 four-axle refuse collector

A four-axle refuse collector provides the basis for maximum economy. When compared to a three-axle vehicle, the longer chassis with higher payload can accommodate a body with a volume of 28 cubic metres; an increase of around six cubic metres. Centralisation of the network of disposal facilities such as dumps or thermal waste-processing plants extends the trips between collection areas and offloading sites. A larger capacity reduces the number of daily cycles with their time-consuming transportation runs.

The higher payload and optimal axle load distribution are additional advantages of the four-axle vehicle. The payload is a real benefit, for example when emptying organic waste bins as a cubic metre of organic waste weighs more than a cubic metre of household waste or recycling.

In the TGS series, MAN supplies a 1+3 axle configuration in which the middle of the three rear axles is driven. The other axles are steered: a leading axle designed for an eight-tonne capacity which can be lifted and the load removed, as well as a trailing axle with a capacity of eight tonnes. The wheel bases are 3750 + 1350 + 1450 millimetres. Further arguments in favour of this axle configuration are the high manoeuvrability and reduced tyre wear.

On a collection round, the driver is constantly on the move, changing gear, braking and stopping between loading points, although they are typically only a few metres apart. In addition, each time he has to turn the hydraulic system for the emptying and pressing functions on and off. The driving profile in a collection round thus differs fundamentally from other areas of operation for commercial vehicles. The gear changing element provided by MAN for rear loading refuse collector vehicles combined with the MAN TipMatic automated gear shifting makes life significantly easier for the driver. The control attached to the arm rest of the driver's seat rests comfortably in the hand. By pressing the button, the driver is able to activate all body-related functions.

The chassis of the MAN TGS 32.360 8x2-6 BL shown at IFAT 2016 is intended for the body of a rear loading refuse collector.



Efficiency – MAN TGM 26.340 payload advantage in refuse collection

When comparing the MAN TGM and TGS series as the basis for a three-axle refuse collector, the MAN TGM really shows its strengths in terms of payload and cab. This is because efficiency is not only measured in terms of price - part of the total cost of ownership (TCO) - but also in terms of ergonomics in everyday handling. The convenient step unit into the cab only involves two steps which is less than in the larger series. This becomes noticeable over the course of a collection round with regular boarding and alighting from the vehicle. The 26.5 centimetre extension of the C cab is an advantage in terms of the space gained for the driver and both co-drivers.

The MAN TGM is designed for a gross permitted weight of 26 tonnes and starts a collection round with around a one-tonne greater payload than the MAN TGS. This represents an advantage in terms of flexibility when loading the 22 m³ body.

For IFAT 2016 and new to the TGM series, MAN is introducing a wheelbase of 4125 millimetres between the first and second axle. This configuration has been developed to meet practical requirements in order to optimize weight distribution between all axles with respect to heavy emptying and the changing centre of gravity of the load over the course of a collection round. This also includes the steered trailing axle designed for a 7.5-tonne load. This improves manoeuvrability in roads with lots of parked cars as well as in narrow side streets and in densely built-up urban developments.

The TGM 26.340 6x2-4 BL exhibited on the MAN stand displays the controls which make the operation of a rear loading refuse collector efficient. It is fitted with the sector-specific MAN TipMatic software, halt brake and control on the driver's arm rest. The vehicle also includes a new generation of safety systems. These include the LGS lane guard system, the emergency braking assistant EBA2 and the emergency stop signal. At speeds above 60 km/h, the LGS lane guard system monitors the vehicle's position in relation to the lane and warns the driver should he accidentally cross the lane markings. The EBA2 emergency braking system fitted by MAN already easily meets the stricter legal requirements for Level 2 which come into force in November 2018 for newly registered vehicles. In the event of emergency braking, the Emergency Stop Signal (ESS) activates not only the brake lights but also the hazard warning lights which flash



rapidly (emergency braking flashing) and thus indicate an emergency situation to vehicles behind.

Safer view - new large screen infotainment system

The need for large in-cab screens is evident in DIN 1501, the standard establishing the safety requirements for the operation of rear loading refuse collectors. The driver uses this to monitor the vehicle environment, for example, when manoeuvring in reverse. In early 2016, MAN will introduce the new MMT Advanced infotainment radio. The 7-inch display is integrated in the instrument panel, which avoids additional screens needing to be fitted which might impede the driver's view of the road. One of MMT Advanced's many functions is the recording of signals from two external cameras. These are activated either at the touch of a button by the driver or automatically through the use of predefined functions. The applications for this are wide-ranging, and not solely within refuse collection. One of the traditional camera monitoring tasks is also to provide a view of both the spreading pattern and the functioning of the gritter. The side camera contributes to increased safety in road traffic. The camera must be retrofitted by the MAN sales organisation in Germany. Its image appears on the screen when the indicators are on and the speed is below 10 km/h.

Body-friendly - MAN chassis

Specialist vehicles are often needed to complete work in the municipal segment that falls under the slogan "Clear. Clean. Tidy". MAN provides factory-configured chassis to meet sector requirements. This can often be seen in specialist designs.

Available ex-works - 5-axle chassis meets sector requirements

When it comes to chassis for large sewer cleaning and suction vehicles, Scandinavian markets are increasingly turning to the five-axle option. Country-specific legislation is often the key factor in terms of vehicle and axle weights. In the TGS series, MAN supplies the 10x4-6 variant in a compact design to improve manoeuvrability. Accordingly, MAN installs a steered and lifting trailing axle ex-works. The two wheelbase variants available differ in terms of the spacing between the second and third axles. The spacings are 1795 + 2050 + 1400 + 1450 millimetres and 1795 + 2505 + 1400 + 1450 millimetres, respectively. MAN has installed a partially raised exhaust system to make optimal use of the space between the axles



for frame components such as diesel and AdBlue tanks, battery boxes and compressed-air tanks. This vehicle design enables increased manoeuvrability at a maximum permissible gross weight of 50 tonnes.

A continuing success story – MAN HydroDrive

The presentation of the MAN HydroDrive in 2005 marked MAN's launch on to the market of a new drive technology variant for trucks. The technical solution of a hydrostatically driven front axle to increase traction when required and to deliver a strong braking effect on steep offroad slopes was received in many sectors with great interest.

The areas of application are unsurfaced roads and construction sites, farm and forest tracks and unclean roads, or roads covered in ice and snow. The benefit of the hydrostatic front-axle drive really becomes evident when an off-road slope has to be negotiated without a load. A typical example of this is the roll-off or set-down skip loader which has put down its swap body at the bottom of a pit. The rear axle, now under very little load, lacks traction on the incline.

MAN offers this system in the widest range of configurations on the market. It is available for two, three, and four-axle vehicles in the TGS series and for two and three-axle semitrailer tractors in the TGX series. MAN has announced that the Hydrodrive design can be ordered in the TGS and TGX series in combination with the MAN TipMatic gearshift system as of the IAA 2016 trade fair in September. Both the "on-road" and "off-road" gear shifting programmes are available. There are no restrictions on use of the engine and gearbox-dependent power take-offs.

MAN has continued to develop this system and improve its operation in practice for users. MAN optimised the routing of the hydraulic lines with the introduction of the Euro 6 design. The clearance around the wheels has been increased to allow for larger rims and tyre widths - even with tyre chains attached.

The driver can activate MAN HydroDrive using a rotary switch even under load and whilst driving. The system switches off automatically above a speed of 28 km/h. The system re-engages without driver intervention if the speed drops below 23 km/h.

The payload advantage compared with conventional all-wheel drive is one of the recognised benefits of MAN HydroDrive. The weight advantage is 500 to 750 kilogrammes depending on the vehicle configuration. From a business perspective, the fuel saving represents a further benefit - when



the system is switched off, the front wheels rotate freely, as with an on-road vehicle. MAN also offers this additional traction for vehicles with a normal height design. The low frame height makes it easier for drivers to enter and exit the cab. The body's lower centre of gravity has a positive effect on driving stability. All MAN TipMatic and MAN HydroDrive components are located below the top edge of the frame. MAN vehicles are thus distinguished by the unlimited options available in terms of bodies.

On descents, the HydroDrive transfers the engine braking effect to the front axle. This provides safety and directional control on slippery ground, and improved vehicle control as a result.

Efficient progress – TopTorque for all MAN TGS and TGX with D26 engines

For the first time at a municipal and waste management trade fair, MAN will present the updates made to its entire TGS and TGX series engine portfolio for IAA 2014. TopTorque, the electronic torque enhancer, is a new fuel-saving technology that has been added to all D26 engines. The engine's power train manager provides 200 Nm more torque in both 11th and 12th gears. Thanks to the higher pulling power, the driver is able to drive for longer in the higher gears. This saves on changing down the gears and reduces tractive force interruption on slight inclines. This results in positive effects on transport efficiency including reduced fuel consumption, increased average speeds and improved driving comfort.

Tailored to the sector in every respect - partially raised exhaust system

MAN offers four and five-axle chassis from the TGS series with a two-part exhaust system. The diesel particulate filter is fitted between the two front axles, and the SCR-cat is positioned on a frame behind the cab. The extension to the variant range is new for 2016: This version is now also available with the 8x4 configuration in combination with the longer L and LX cabs.

The advantages of this arrangement are the avoidance of dust swirling from an exhaust tailpipe which discharges downwards and the increased space provided on the frame between the second and third axles. This free space can be used for larger fuel tanks or for attachments needed by the body. Alternatively, a vehicle with a shorter wheelbase can be chosen for the same task, which makes for better manoeuvrability.