TECHNICAL REPORT

D6 *Tier 4*

MECHANICAL - SUCTION SWEEPER 6.1 Yd³

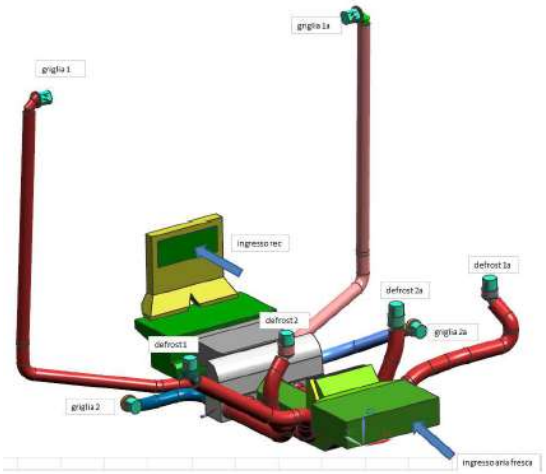
The D6 mechanical-suction sweeper has been produced with the needs of users and the environment in mind and to the latest design and ergonomic concepts, with a small impact on the environment both for the reduced use of water, fuel and for the emission of dusts and noise.
The LOAD SENSING system in the hydraulic system and the optimisation of the sweeping functions that adapt to the framework conditions through the ***AST system*** ***(Adaptive Sweeping Technology)****, make it possible to significantly reduce consumption.*
The D6 sweeper uses an electronic transmission system that optimises engine performance in any situation and avoids the use of unnecessary power which would result in an unnecessary consumption of fuel.
The transmission allows a maximum speed up to 0 mph (32 km/h) and a maximum gradient during sweeping of ~20%.
Easy handling is guaranteed by the four-wheel steering system during work and 2-wheel steering system during transfer.
The mechanical-suction system is based on the combination of two collection systems, one purely mechanical and one suction by depression.
Collection by means of the mechanical operation is ensured by brushes which convey the waste collected along the path towards the centre of the machine. Also, a central roller brush, housed between the rear and front wheels, takes the waste to a vertical conveyor, driven by a belt drive system ***(Dulevo Patent),*** *which transfers that collected to a watertight container made of AISI 304 stainless steel.*

Collection through suction takes place thanks to the vacuum created in the collection area by means of two powerful turbines, this ensures the collection of the dust formed during the work stages as well as all light waste (leaves, paper, dust, etc ...) that the machine encounters during the path.
Thus, the collected dust is also conveyed to the waste container, where a fabric filtering system completes the sweeping cycle, ensuring the release of clean air into the environment.
*A dust collection and removal system is also available, perfected by means of a PTFE membrane filter exclusively developed with GORE **(Dulevo Patent)**. In addition to ensuring greater filtering steadiness and efficiency, the system has a better self-cleaning capacity and greater resistance to water.*
The machine is powered by a 4485 cc FPT diesel engine.
The engine is installed in a central position to maintain an optimal distribution of the weight and ensure stability in any given situation.
The machine is built on a solid chassis with progressive leaf springs, both rear and front shock-absorbers, and a hyper-sprung cabin, which makes sweeping operations extremely easy and comfortable.
The cabin, designed to prevent the entry of dust, ensure the operator with very high levels of clean air while the wide glass surfaces and reduced internal dimensions ensure greater visibility.
Thanks to its symmetrical construction allows two operators to move comfortably.
The main controls, which activate the functions, are located in a touch screen panel in the centre near the operator, while the third brush is operated by controls on the side armrest.

CAB

The cabin has been completely redesigned starting from the external and internal design, first step of the design process, to then move on to the next steps, divided into component layout, ergonomics, comfort, air conditioning.
To ensure an optimal air quality, the cabin structure has been designed to ensure absolute dust tightness.

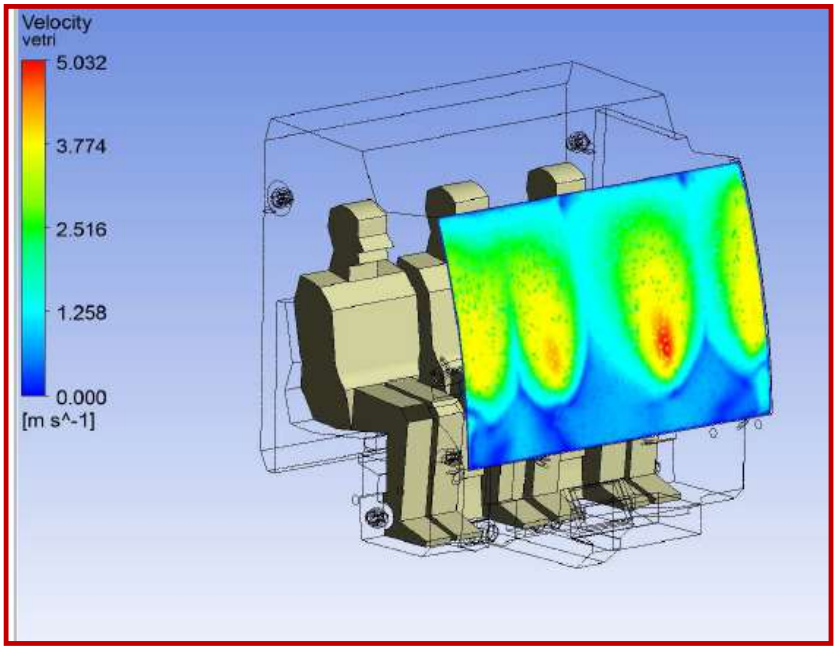
The air ducts have been designed to disperse minimum heat and have minimum resistance to ensure an optimal air flow



A very important point concerns ergonomics.
We are constantly looking at well-being in the workplace, for an operator the workplace is the cabin. Ensuring minimum vibration and noise levels has become one of the key objectives in designing the sweeper.

The positions of the work controls must not distract the operator from driving and must be compatible with view of the outside.

Well-being in the cabin is ensured thanks to an adequate and careful design of the air conditioning.
system, made using the most innovative technologies available.
Thanks to a preventive virtual simulation analysis with specific programmes, the flows in the cabin were analysed and the wrong and thus expensive solutions were avoided.
The adopted solutions ensure an optimal distribution of air flows to have homogeneous temperatures and, in the event of high humidity, cope with the fogging of the windows.



*The cabin complies with the **EN 15695** Standard which defines the specifications of the cabin air quality for industrial agricultural and earth-moving machines.*
In addition to the EN15695 certified filter, it is possible to assemble the classic dust and pollen filter or a Carbon Fibre filter, recommended for environments subject to chemical contamination.
The three types of filters can be interchanged with each other.

A suspension system between the cabin and the chassis cancels vibrations during operation and absorbs the bumps in the ground during the transfer phase.
The tilting system of the cabin by means of a hydraulic pump also allows easy access to the internal combustion engine and to the mechanical parts arranged behind the cabin itself.
Thanks to the wide side glass surfaces and extended windshield, the operator has seamless visibility in all directions.

The machine has two symmetrical seats with the possibility of driving on the right or left (Optional).
Both seats are adjustable and have shock absorbers; even the steering long nut is adjustable to ensure that all operators can choose the right driving position.

The driving and sweeping controls are simple and intuitive with an ergonomic layout to not tire the operator during long work shifts.

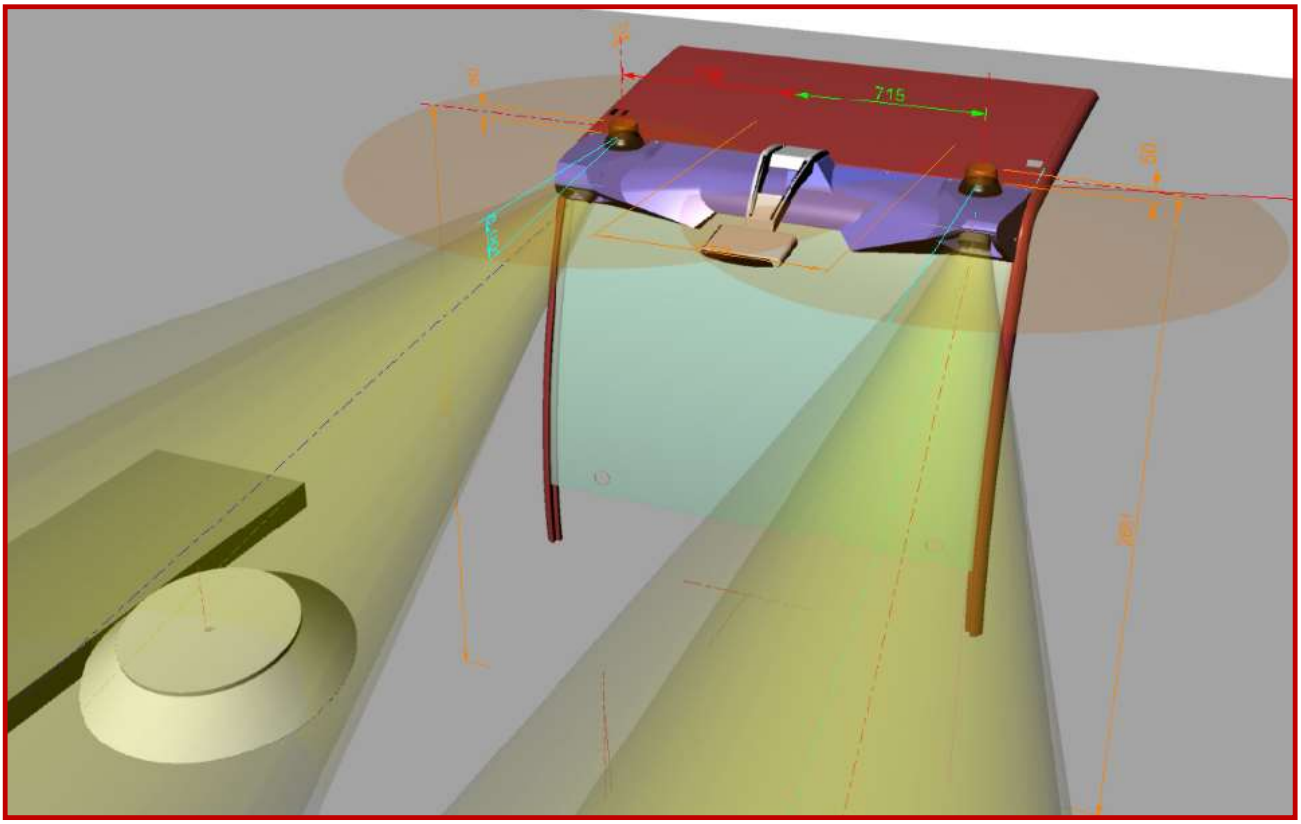
The standard machine equipment includes air conditioning with manual climate control and a rear view cam in the cabin.

It is possible to install, also in the upper part of the cabin, a car radio with USB and Bluetooth Hands Free connection system (Opt)

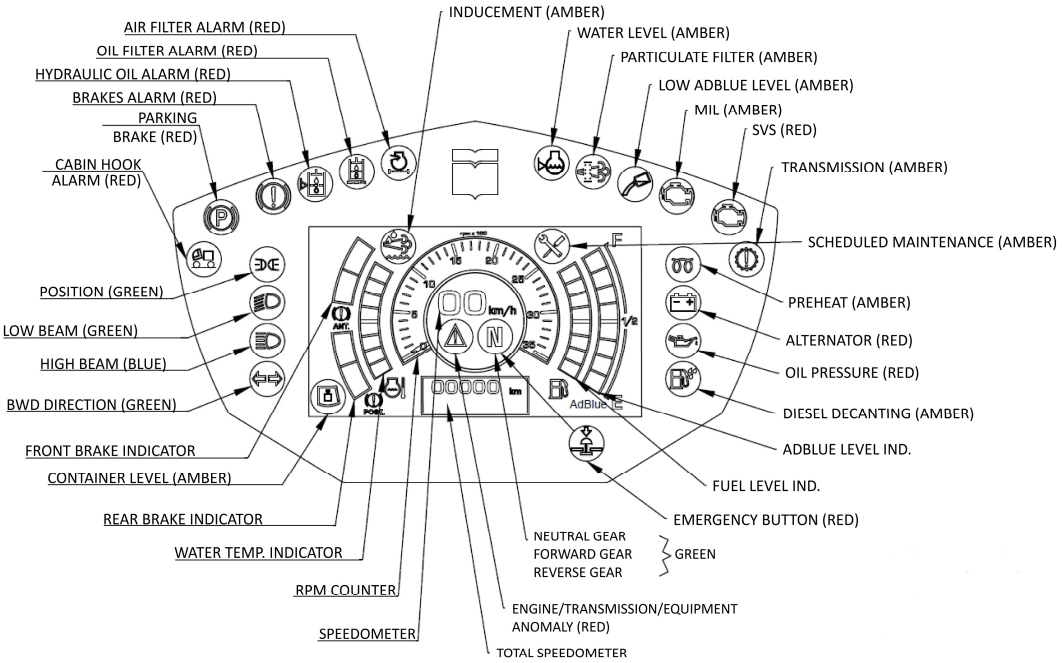
In the central part of the machine, between the two seats, there is a glove compartment refrigerated by the A/C system which, in addition to being a convenient storage, can also be used as a drink holder. Nearby there is a 12V socket to charge mobile phones.

There is an additional glove compartment and a 12V socket on the front dashboard, near the front windshield.

In addition to renewing the aesthetic impact, the design of the external covers must ensure excellent view of the work area.
This is why the light beams of the auxiliary LED lights were studied, and the size and shape of the aesthetic elements were aligned for the purpose.
The standard configuration of the machine has two work lights, while when it is equipped with the front brush, the system is doubled (4 Work lights) for maximum visibility.



OPERATION, TRANSFER AND ROAD CIRCULATION



The driver's seat is equipped with a panel on the steering column for the functions and instruments relating to the carriage with the following information and warning lights:

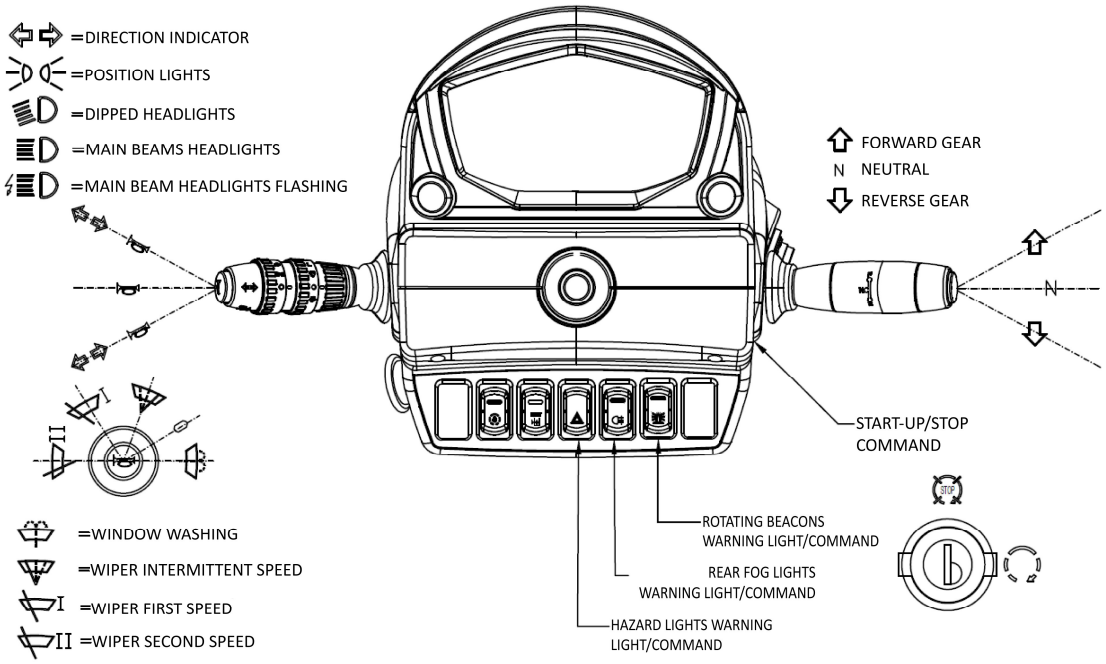
- *Diesel engine water temperature indicator*
- *Diesel engine speed rpm counter*
- *Speedometer*
- *Fuel level indicator*

The display shows the following information:

Indication of instantaneous pressure value (bar) front axle braking system
Indication AdBlue level in the tank
Indication of instantaneous pressure value (bar) front axle braking system
Indication of the total km

Signal warning lights:

- *Failed battery charge warning light*
- *Oil filter warning light*
- *Rear axle brake pressure warning light*
- *Hydraulic parking brake system anomaly warning light (OPT)*
- *Parking brake warning light*
- *Automatically lowered suspension warning light*
- *Open dumping door warning light*
- *Closed container damper warning light (OPT)*
- *Container level warning light (OPT)*
- *Water presence in diesel filter warning light*
- *Additional tank water failure warning light (OPT)*
- *Clogged engine air filter warning light*
- *Engine oil pressure insufficient warning light*
- *Dipped headlights and position lights warning light*
- *Cabin connection warning light*
- *Right direction indication warning light*
- *Reverse drive warning light*
- *Hydraulic oil level warning light*
- *Front axle brake pressure warning light*
- *OBD warning light*
- *Lifted container warning light*
- *No water warning light*
- *Engine cooling liquid level warning light*
- *Spark plugs pre-heat warning light*
- *Diesel engine diagnostics warning light*
- *Left direction indication warning light*
- *Forward drive warning light*

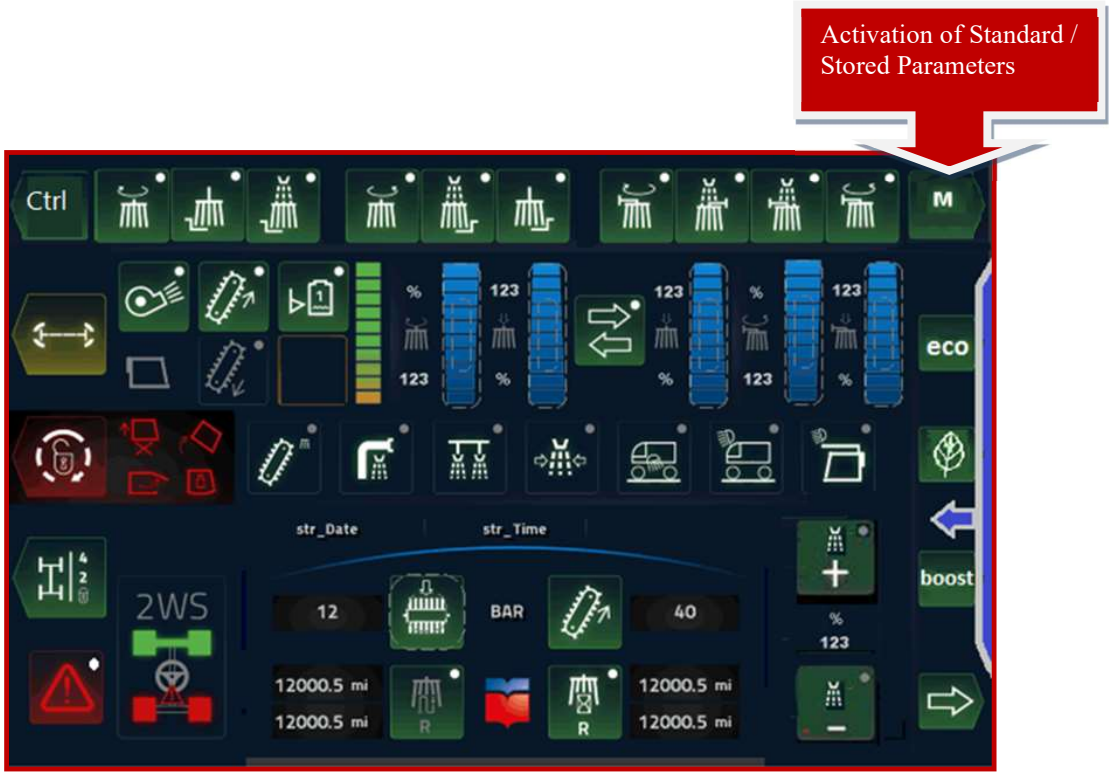


From the steering column you can activate:

- *Drive direction selection lever*
- *Central brush extra pressure button*
- *Right and left direction indication*
- *Horn*
- *Flashing and main beam headlights lever*
- *Windshield washing liquid*
- *Intermittent front wipers or at two speed*

WORK AND SWEEPING FUNCTIONS
(AST System - Adaptive sweeping technology)

By activating the work phase control, the engine reaches the optimal rotation speed of 1500 rpm.



Pressing the M button on the Touch Screen panel will activate all the sweeper functions that have been set by Dulevo or stored by the operator.

MODE: ECO / BOOST / LEAVES

During the work phase the machine is set to standard mode, but if necessary, the operator can change the Dulevo parameters by switching to:

***ECO** (Example - Little material on the ground)*
allows to reduce fuel consumption and noise emissions

***BOOST** - Maximum sweeper performance for collecting a lot of material or heavy material*

***LEAVES –** The machine will set itself for this specific work*

In this mode, the rear suspensions change position.
Transport height from the ground about 7.8 In (20 cm)
Example of leaf mode selection on the display

The three work modes, which are factory-set by Dulevo and cannot be changed, vary the suction power and the number of revolutions of the central brush.

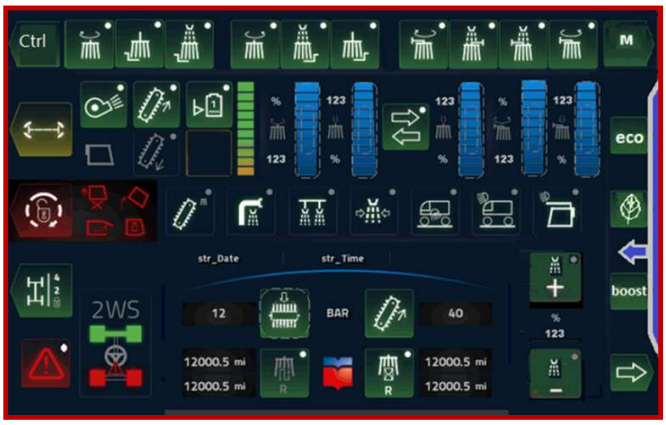
The stored functions can be accessed by scrolling the drop-down menu.

For example, the M1-M2 memories allow to configure the work modes of other operators or the operating modes that the driver uses for driver environments or places (e.g. city centre, market, suburbs).
There is an additional key for the set-up of future sweeping functions.

The editable and storable parameters are:

1. *left brush ground pressure*
2. *right brush ground pressure*
3. *side brush speed*
4. *central brush pressure*
5. *third brush pressure*
6. *third brush speed (armrest potentiometer)*

Screen 1 *- to recall the pop-up, tap on the display near the icon*



Tapping the + and – symbols changes the setting in real time.
To maintain the change, before exiting the pop-up ***press CONFIRM***

Screen 2 (analogue symbols)

Tapping the + and – symbols changes the setting in real time.

Water flow adjustment:

To change the water pump flow rate, use the touch controls at bottom-right of the 10" display.

Minimum flow rate 0 maximum 100.

To store the previously selected parameters, simply activate the CTRL Key and then the memory to be assigned. Confirmation of the operation will appear on the display.

All the symbols of the function texts on the display comply with the EN15429-4 Standard

AWS (Adjustable Working Speed) SYSTEM AND STANDBY

When the sweeper is in work mode, the AWS system is automatically enabled.

The AWS function allows the operator to adjust, via the function display, a maximum speed percentage during the work phase.
This way, the operator, by pressing the forward pedal all the way and therefore in the most comfortable and ergonomic position, can reach the desired and optimal speed range.

The speed can be increased or decreased at any time during the work phase and at the driver's discretion.

The AWS system is supported by the STANDBY function engaged:

- *On the adjustment potentiometer of the side brushes in Standard configuration.*
- *On the function Joystick if the machine is equipped with front brush.*

During the work phase, the operator can at any time exit the set work mode and move to another point without any pre set speed restrictions.

When exiting the work mode, all sweeping functions stop, the brushes are raised and the water pump stops.

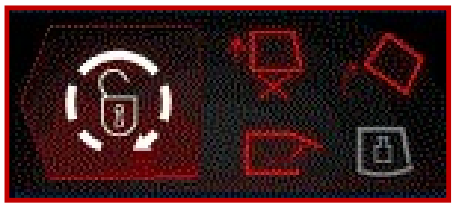
All active functions remain stored and are visible on the display with different colour indications.

By activating the STANDBY function again, the operator can resume work in the previously set configuration.

HOPPER UNLOADING PHASE

Activate the function release using the appropriate command on the armrest and activate the required commands.
the container must be handled with the parking brake engaged.
The armrest is also present in the version without the third brush and so without the Joystick.

During the unloading phase, the movements are limited to a speed of approximately 1.5 mph (2.5 km/h).



For safety reasons, during the work or transfer phase, the icons must be white.

Modifying the rear suspension position:

The machine automatically sets itself in the defined position for collection, unloading and transfer.

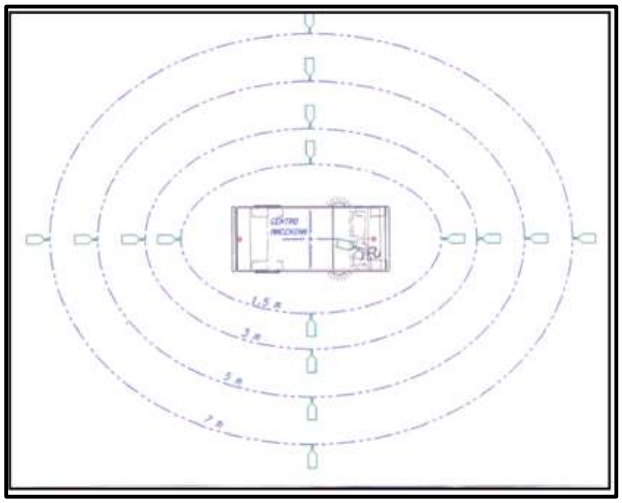
The manual control (on the armrest) changes the pre-set thresholds to move the transport closer or further away from the ground.

The position change is identified with the warning light.

To restore the position, press the front button of the joystick of the third brush.
Once restored, the warning light appears.

NOISE EMISSION

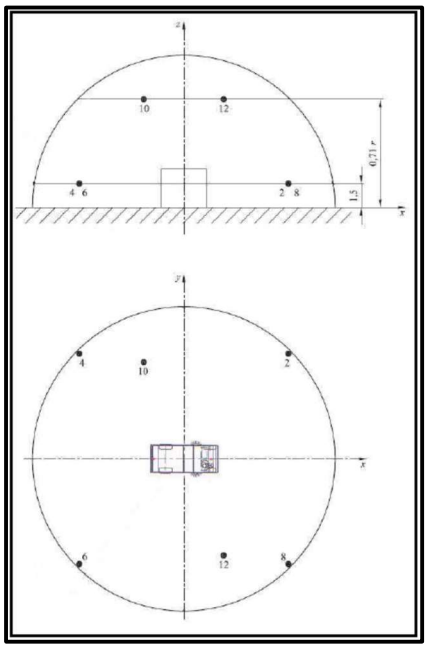
Particular attention during the development of the cab was given to soundproofing, providing the operator with a comfortable driving position and low noise even during the work phase.
Below are the values that the operator perceives during the work phase.



	Measured Level [dB A Leq]	
	Wind. Closed	Window open
Operator Station	67.0	67.1

SOUND POWER

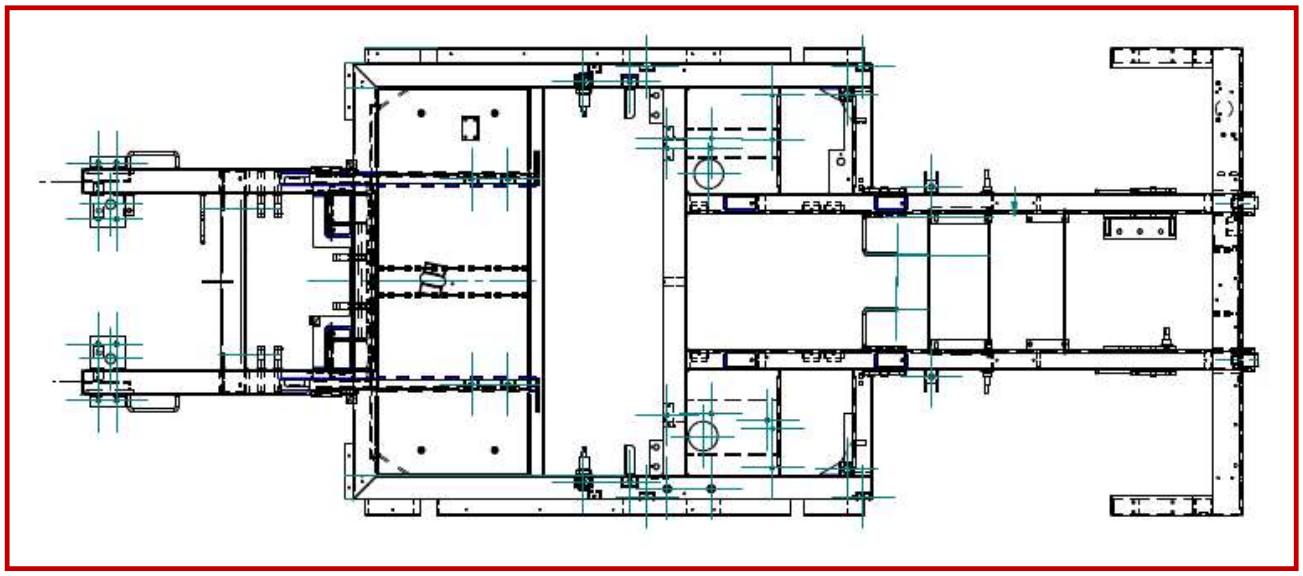
During the work phase, the sweeper with all functions active and at full working capacity, introduces the following values in the environment:



Measuring Point	Measured Level [dB A Leq]	Acoustic Power L_{WA} [dB]
2	67.3	99.5
4	73.9	
6	73.6	
8	68.8	
10	71.3	
12	70.5	

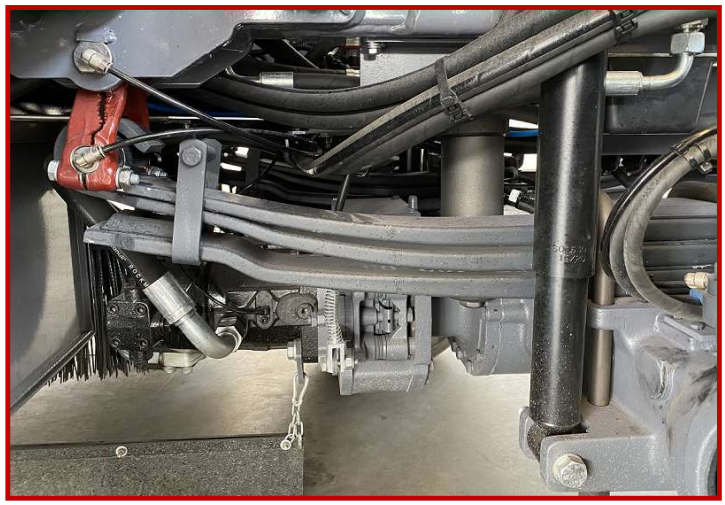
CHASSIS

The machine is built on a sturdy S355 steel chassis, with 0.2 In (5mm) thick, 220 x 100 mm tubular sections, treated for anti-corrosion (sanding and cataphoresis) and coated (approximately 90 - 110 micron), equipped with leaf springs and front and rear shock-absorbers.
The sweeper is equipped with a towing device positioned in the front of the vehicle.



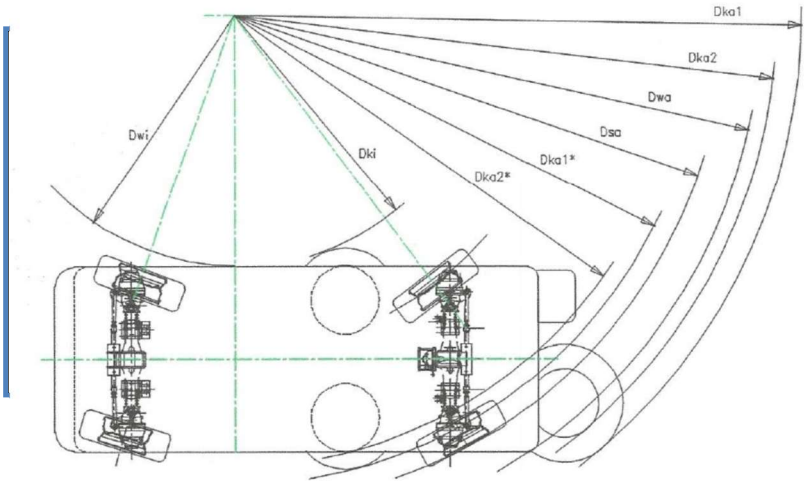
SUSPENSION

Front suspension with progressive leaf springs to increase driving comfort.
Hydraulic type rear suspensions that can be automatically adjusted in various positions consequently to the work mode: low position to be used in the standard working phase, intermediate position in the leaves work mode, high position to be used in the transfer phase and for overcoming height differences up to approx. 8 In (20cm), with the possibility of intermediate adjustments via the manual system.
This hydraulic suspension automatically keeps the ground clearance of the chassis adjusted, regardless of the weight of the collected waste.

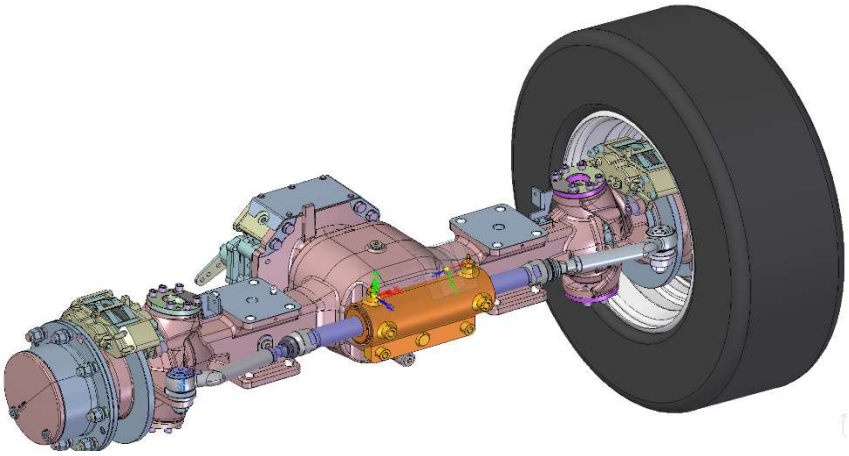


STEERING

The steering is power assisted so that it can be operated without effort even during manoeuvring.
The machine is equipped with a steering system synchronised on all four wheels which allows high manoeuvrability and overcomes a problem typical of machines not equipped with this system, that of the loss of debris on the outer side of the curve caused by the fact that the central brush is dragged sideways and is not on the axis of curvature.
The system is composed of two "through" steering cylinders, positioned one on the front axle and one on the rear axle of the machine, connected in synchronism.
It is powered by power steering with built-in safety valve.
The average curb-curb steering diameter is 31.8 ft (9.67 m).



It was necessary, to increase driving safety and comfort, to design the steering wheel so that the steering of the rear axis can be locked.
This involved redesigning the hydraulic system, taking into account both the reliability of the system and the safety required for a critical element such as the steering wheel.
It was also necessary to modify the axle group to introduce sensors that detect the exact position of the wheels so that the steering wheel is aligned in all driving configurations and so that, using the appropriate commands, it is possible to act on the hydraulic components to adapt the steering for the various working phases of the sweeper.



During the work phase the 4-wheel steering mode is activated, while during the transfer phase the machine automatically switches to the 2-wheel steering mode.
If necessary, the 4-wheel steering configuration can also be activated during the transfer phase.

WHEELS

The machine is equipped with four wheels that ensure maximum machine stability both during work
and during dumping of the waste container at a height.

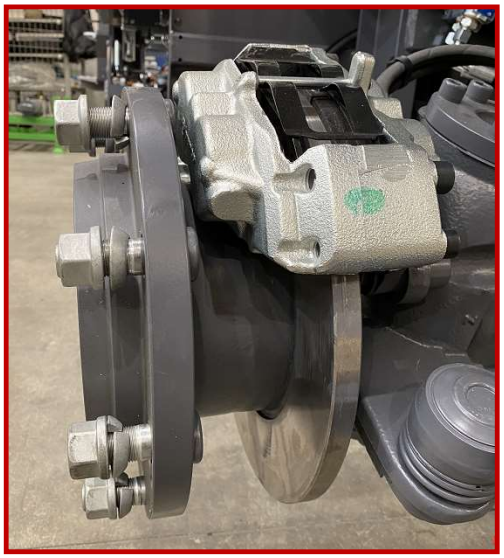
Tyre dimensions
285/70 R 19.5 TUBELESS

M+S (Mud and Snow) type tire

BRAKING SYSTEM

The differential axles are equipped with dry disc service brakes keyed on the axle shafts of the wheels; pedal control with hydraulic transmission with two independent circuits.

- *The emergency brake is merged with the service one.*
- *The parking brake is a disc on the input transmission to the motion operated by hand lever control and steel cable transmission or parking brake with spring cylinder and negative lever proportional control in the cabin.*

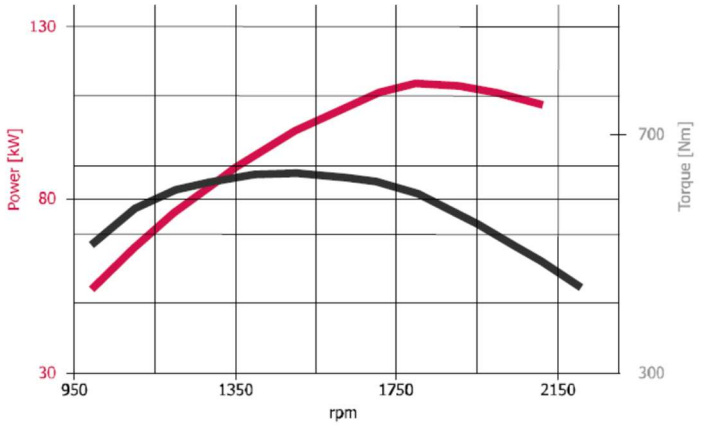


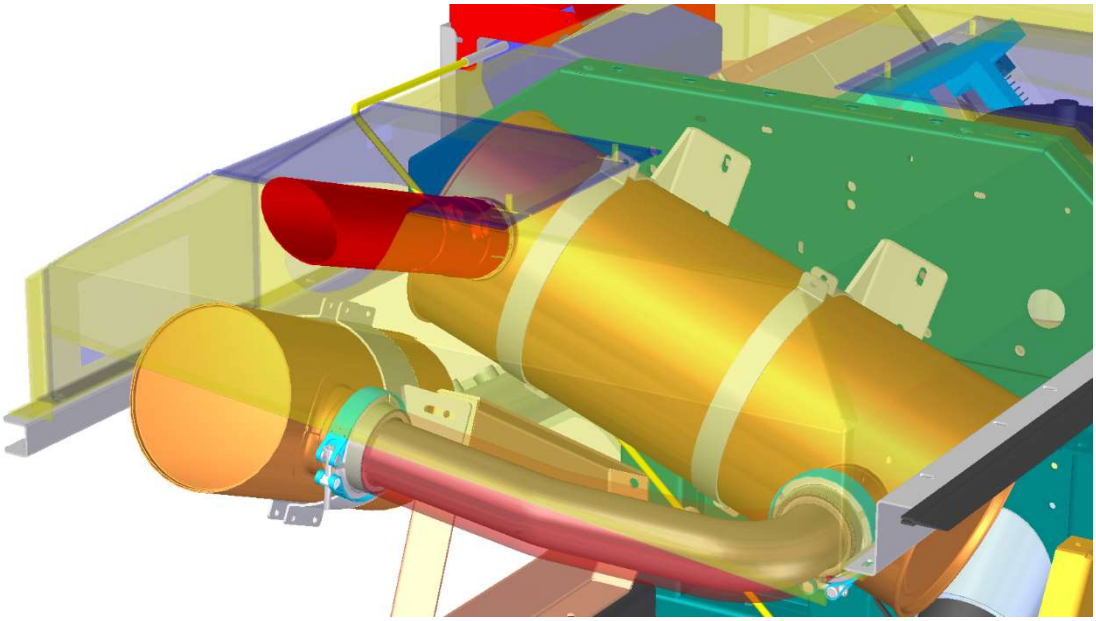
ENGINE

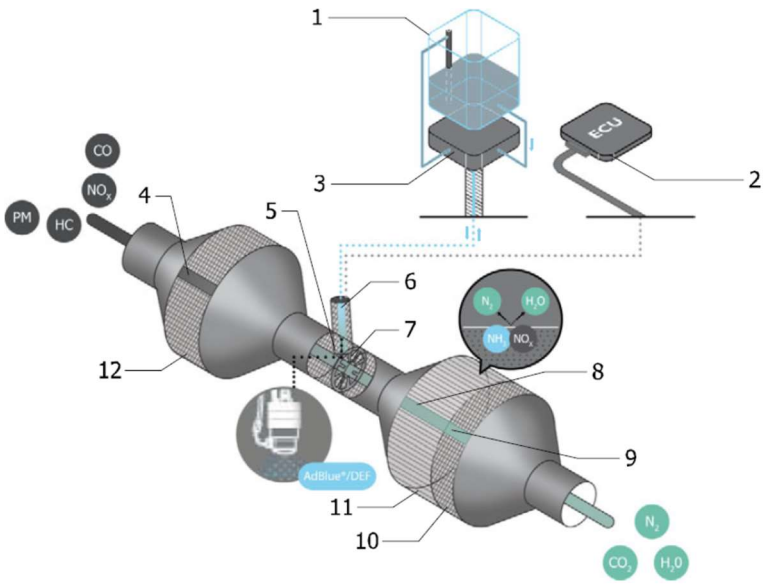
The sweeper engines have the following features:

Brand: *FPT*
Model: *F4HFE414H*B022 (NEF N45 TIER 4B)*
Cycle: *DIESEL*
Cylinders: *4*
Displacement: *274.7 In³ (4485 cc)*
Max power: *138 Hp (103 kW) at 2200 rpm*
Cooling: *Water*

The high power of its internal combustion engine allows you to work at low speeds, which results in reduced consumption and lower noise during the work phase.
The engine is equipped with a suitable device for preheating spark plugs aimed at favouring start-up in the winter period.
The fuel tank has a total capacity of 37 Gal (140 litres).







LEGEND

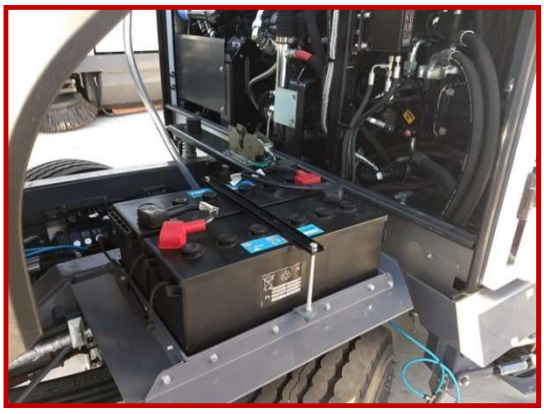
PM	Particulate matter
HC	Unburnt hydrocarbons
NO_X	Nitrogen oxides
CO	Carbon monoxide
N_2	Nitrogen
CO_2	Carbon dioxide
H_2O	Water

AdBlue /DEF = $CO(NH_2)_2 + H_2O$

1.Urea tank 2. Control unit 3.Supply module 4. Diesel oxidation catalyst 5. Urea Injection 6. Dosing module 7. Mixer 8. Selective catalytic reduction 9. Clean-up catalyst 10. CUC 11.SCR 12.DOC

ELECTRICAL SYSTEM

The electrical system is designed to comply with the applicable rules of the highway code and features a 24 Volt power supply voltage.
The system is equipped with 24V 140Ah battery, supported by the alternator of the 90A engine.



To improve access for inspection and replacement, as well as reduce the possibility of wash water stagnating, the battery compartment has been repositioned on the left side, above the wheel.

The layout of the electrical wiring has been redesigned so that they are laid on one side of the machine, in order to facilitate identification and any maintenance. The power lines have been shortened, the section has been increased to 70 mm² and the red/orange T3 class silicone sheath has been introduced (Ease of identification and Max operating temperature up to 125°C according to ISO6722)

The electrical part is disconnected by an automatic battery cut off switch (electric) repositioned outside the engine compartment, which is triggered whenever the machine is switched on and/or off, in order to avoid energy dispersion.
The disconnecting switch is activated via the switch located.
on the steering column. If after the activation the machine is not turned on, the disconnecting switch automatically closes the power circuit.

In the cabin, on the rear wall between the two seats, there is a compartment that contains the fuses that protect the main circuits required for road circulation and machine functions.

There is an OBD plug for connecting the diagnostics and accessing the various control units located on the machine and which communicate with the CAN-BUS line.
Any anomalies of the CAN lines and solenoid valves can also be checked on the Central display.

In standard configuration, the machine is equipped with the DULEVO TELEMATIC remote telemetry system.

The Circulation light system is almost entirely of the LED type, except for the front dipped headlights and main beam headlights. The flashing lights and work lights are also of the LED type, to reduce energy consumption and maintenance.

The IP4X to IP67 degree of protection of the system varies depending on machine areas.

HYDRAULIC SYSTEM

The hydraulic system includes different circuits, powered by a single oil tank located in an easily accessible area in S235 material, thickness 0.1 In (2.5 mm) painted.
The tank is equipped with a level gauge and temperature gauge on the side of the machine and well visible from the ground; both the hydraulic traction and service systems have a filter in common, positioned in the upper part of the tank which allows quickly replacing the cartridge without oil leakage.
Another filter has been inserted under pressure before the main service distributor to further preserve the hydraulic system components from wear.
A pressure switch installed on the tank filter alerts the operator, in real time, of any clogging, through a special warning light.
Also, a float electrically signals in the cabin of the possible decrease in oil level for probable leaks.

The hydraulic system has been designed with LOAD SENSING technology.

The Load Sensing architecture used in hydraulics, is present when, in the control circuit, the flow rate flowing in the distributor and directed to the actuator is independent of the load conditions but only depends on the opening of the distributor itself.

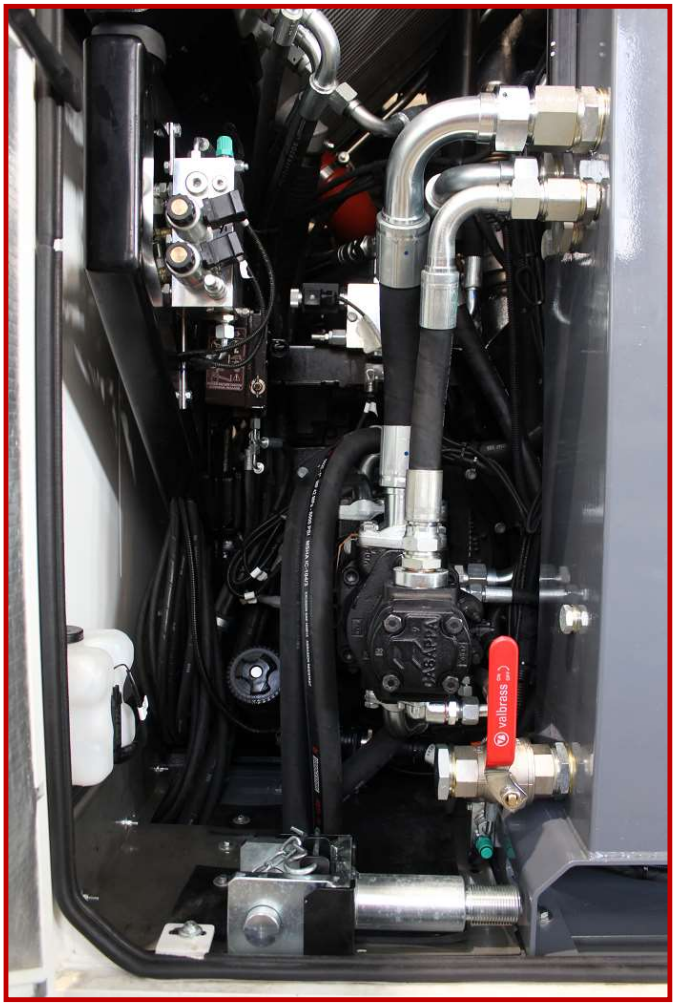
The advantage of this architecture is multiple.

Energy saving on the one hand, a simpler speed control of the services determined by the user, simply by adjusting the opening of the distributor, on the other hand.

By using this technology, the Load Sensing pump circulates the hydraulic oil only if needed by the users, saving power during low use of the services such as, for example, in the travel phase.

All this results in a significantly lower fuel consumption.

The steering box remains powered by a gear pump as well as the steering wheel and suspension as these are safety circuits. The power steering circuit is provided with a relief valve, calibrated at 1823 PSI (125 Bar).
The fluid tank is provided with a filler cap with vent device, a drain plug and suction filter.
All circuits are fitted with a calibrated safety valve so as to protect the entire system against possible pressure peaks.
To avoid excessive system heating, the same has been provided with an air-oil heat exchanger.



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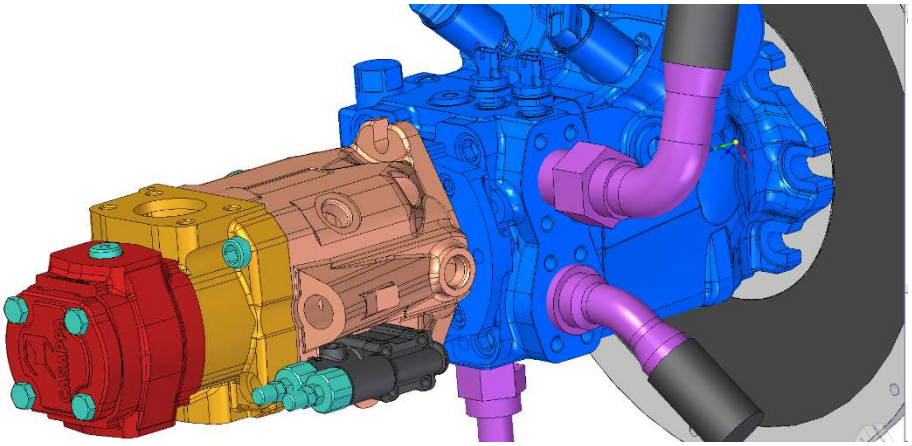
TRANSMISSION

The D6 uses an electronically controlled hydrostatic transmission. The transmission consists of an A6VM107EP200P000A/65 motor and an A4VG090ET20P/35MRN pump. This system, in constant communication with the engine control unit and with a support unit on the machine, makes it possible to use the entire engine potential and avoids using unnecessary power to benefit consumption. Through this hardware architecture it is possible to manage three separate operating modes: Travel, Work and Unloading. In the first mode, called Travel mode, the accelerator pedal controls the number of revolutions of the Diesel engine and simultaneously the machine's travel speed.
In the travel phase, when the transmission needs maximum torque, the system requires the engine to position itself at 1950 rpm, while when the torque request decreases the speed goes to 1500 rpm. While in the Work mode, the Diesel engine speed remains fixed at around 1500 rpm or 1800 rpm, depending on the selected mode, and the accelerator pedal only controls the machine's travel speed. In this mode, suitable logic blocks inserted in the control unit make it possible to operate all the sweeping equipment, except for waste container movement. In the Unloading mode the engine speed is set at a speed slightly above the minimum, no equipment can be operated, except obviously the waste container movement. In this mode it is possible to move the machine using the accelerator pedal but only at very low speed.



The transmission ensures a gradient that can be exceeded during the work phase of about 20%.
The forward and reverse gears are engaged via special control selector located on the steering column in the cab.
Both directions, chosen with the selector, are signalled by special warning lights.
When engaging the reverse gear, at the same time as the reverse light, an audible alarm is triggered as well as the rear video camera to ensure maximum protection to nearby people.

MECHANICAL SUCTION SYSTEM

Mechanical system:

The mechanical system collects waste, and it consists of:

- *one or more side brushes that rotate conveying waste to the centre of the machine.*
- *a central brush that conveys the waste on the conveyor.*
- *a conveyor with blades that rotate taking the material up and dumping it inside the container.*

Suction system:

The suction system sucks dust and light parts into the container and then to the air filtration; the system consists of:

- *two turbines driven by two hydraulic motors.*
- *a bag filter.*
- *one filter shaker electrically controlled by the cabin operator.*

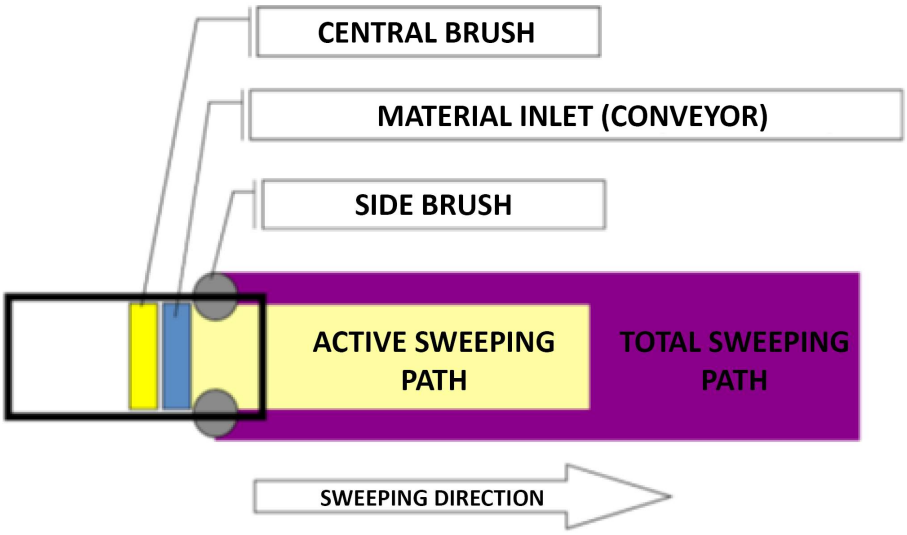
SWEEPING SYSTEM

The D6 sweeping system consists of:

1 central roller brush with a diameter of 25.6 In (650 mm) and width of 50.4 In (1280 mm), with operating pressure automatically adjusted via hydraulic controls in the cabin.

2 side brushes of 41.8 In (1060mm) (version without earmuffs)

1 third front brush (OPT) of 50.4 In (1280 mm) diameter, operating by means of controls in cabin with hydraulic system and adjustment for positioning and rotation.



The main collection system, consisting of a central brush, transport and side brushes, is perfectly symmetrical with respect to the machine frame and, therefore, makes it possible to work on the right and left side without any restriction.

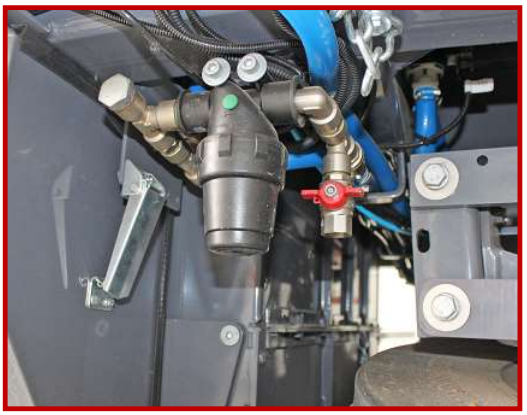
SWEEPING WIDTH

- *with central brush* — *51.2 In (1300 mm)*
- *with central brush and one side brush* — *80.8 In (2050 mm)*
- *with central brush and two side brushes* — *110.3 In (2800 mm)*
- *with central brush, two side brushes and third brush only rh or lh* — *130 In (3300 mm)*
- *with central brush, two side brushes and third brush rh/lh* — *141.8 In (3600 mm)*

WATER SYSTEM (Opt)

Dust removal system, auxiliary to the suction system, guaranteed by nebulisers placed on the side and front brushes powered by a membrane electric pump.
The flow can be varied by adjusting the pump speed from the control panel in the cabin.

The water tank is 0.1 In (2,5mm) thick made from AISI 304 stainless steel with a capacity of 150.7 Gal (400 litres) (easily drained through the ball valve).



When the water tank is empty, the pump automatically disconnects alerting the operator in the cabin via a special warning light.

The water level is visible on the cabin display.

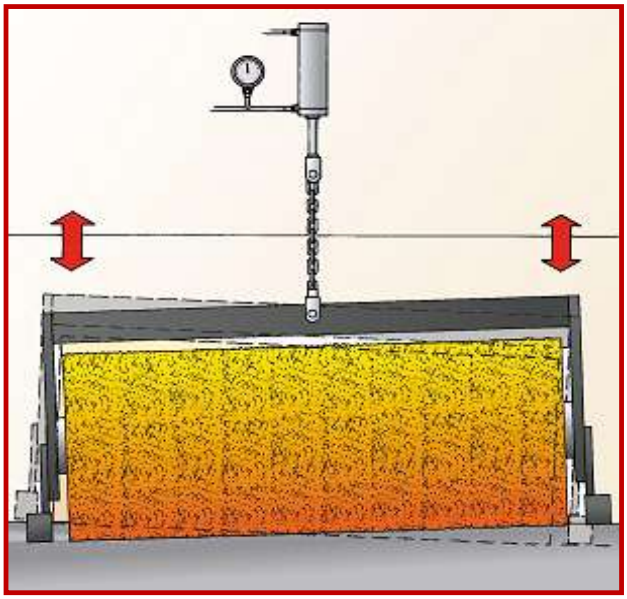
A special filter with internal cartridge, positioned in an easily accessible area, allows smooth operation without occlusion of the nebulisers on the side brushes.

The tank contains breakwaters to ensure better resistance.
For the supply of clean water, the tank is fitted with a UNI 45 female screw coupling valve, a 19.7 ft (6 metre) long water supply pipe, an overflow pipe and an external level gauge.

When the sweeper is equipped with a water system, it is equipped with a system that drains the water from the pipes and solenoid valves, in order to avoid failures caused by freezing during the winter/low temperature periods.

CENTRAL BRUSH

The cylindrical central brush is positioned on the rear and centrally with respect to the side cup brushes. Throwing the debris directly on the vertical conveyor ensures collection of any kind of debris, from fine dust to heavier and larger debris.
The perfectly balanced central brush unit is supported in the centre to allow an oscillation for perfect adherence of the brush to the ground, in any condition. The brush presses against the ground by means of a tested hydraulic system that follows the shape of the land while maintaining a constant pressure.

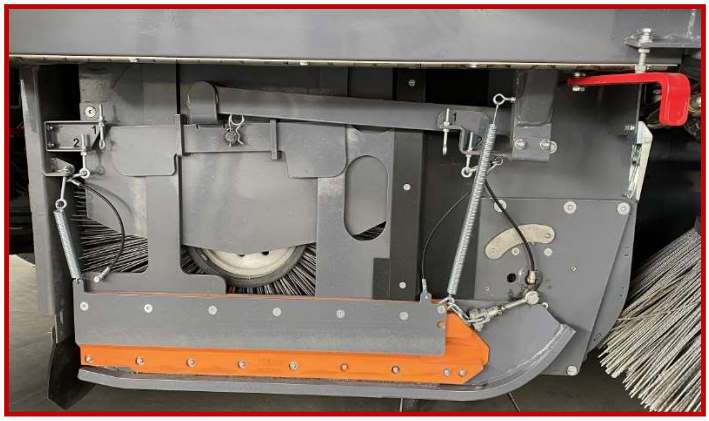


The system can be adjusted from the operator station and the pressure data are visible on the display, to cope with the progressive wear of the brush and the adverse work conditions to which the machine is subjected.

During the work phase, the rotation speed of the cylindrical brush is of about 150 g/min. The brush roller is 50.4 In (1280 mm) long, while the total outer diameter of the brush is 25.6 In (650 mm).

The sweeping part of the brush is composed of 3x2 mm section polypropylene bristles.
The brush features a bristle that indicates the loss of performance and the need for replacement.

The disassembly system has been simplified, making the operation much simpler and the use of tools minimised. Hooks are also provided to facilitate the insertion of the central brush. ***(Time reduced by 50% - about 15 minutes)***



SIDE BRUSHES

The machine is equipped with two side cup brushes, one on the left and one on the right, hydraulically operable for positioning and rotation. The two side brushes can be operated independently or together, according to the work needs and are fitted with an automatic return system in case of impact.

The brushes automatically come out when activated and retract when they are disengaged, increasing machine safety.

When the steering exceeds a certain angle, the external brush automatically retracts to ensure an optimal coverage of the cleaning track.

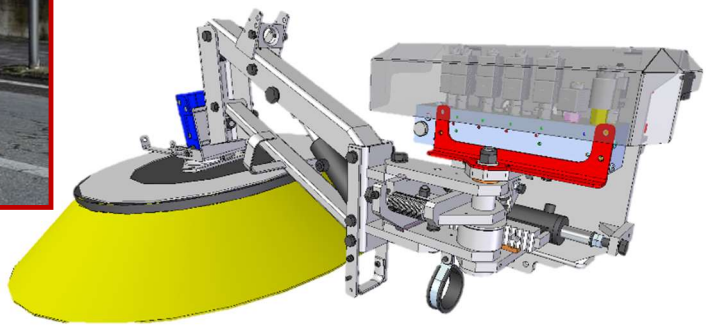
The mechanical adjustment of the lateral inclination of the brushes with respect to the ground, also allows for an always perfect adjustment for each type of application.

The rotation speed of the two side brushes is adjustable directly from the operator station, with values ranging from 0 to 70 rpm, the result of a careful analysis of market needs. It is also possible to adjust the pressure on the ground of the side brushes by means of the hydraulic system, that can be modified using a command on the touch screen panel. These further technological introductions make it possible for the operator to conveniently and practically adapt the sweeping system to the type of collection to be made and, therefore, optimise the cleaning quality, increasing the life of the brushes up to 50%.
The total outer diameter of the brush is about 41.8 In (1060 mm).
The sweeping part of the brush is composed of 0.12x0.08 In (3x2 mm) section polypropylene bristles, mixed with 0.12x0.08 In (3x2 mm) section steel sheets.

The brush features a bristle that indicates the loss of performance and the need for replacement.

RIGHT AND LEFT FRONT BRUSH (Opt)

The third front cup-shaped brush is hydraulically controlled in all its functions directly from the operator station.
The travel system has been improved and reinforced by introducing a second support and sliding point reducing the strain on the upper bearings.
The system allows to use the weed brushes without additional reinforcement accessories.

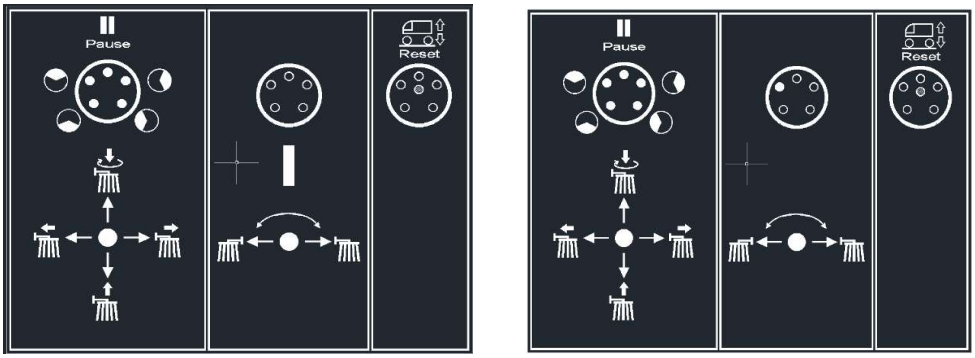


Joystick functions 3rd brush

Forward activates the DOWN
Backward activates the UP
Right carriage out
Left carriage in

Buttons:
Green (up) right incidence
Green (down) left incidence.
Black (up) front inclination
Black (down) rear inclination
Grey pause/work (as neutral gear)

Front button (joystick) reset suspension.
Restores the work or travel position after having moved the suspensions with the manual control.



Travel command:

- *To the right: move the joystick to the right with the dead man control (trigger control on the front joystick).*

- *To the left: move the joystick to the let with the dead man control (trigger control on the front joystick).*

Potentiometer (armrest):

- *Turning the potentiometer clockwise increases the speed of the third brush from 0 to 100% - anti-clockwise it reduces.*

Work angle 270°: The set value is shown on the display (cannot be edited by touch)

This solution allows an accurate and effective use of the front brush without the operator being distracted from driving the vehicle.

The brush swings 180° to left and right with the possibility of brush return in the stand-by position on both sides.

In the event of a slight impact, the support arm of the third front brush is provided with a hydraulic shock-absorbing system and a mechanical system with cup springs. In the event of more serious impacts, the third front brush is equipped with two safety systems:

1) *automatic and immediate return of translation thanks to a sensor that reads the pressures to which the front brush is subjected in the event of impact.*

2) *breaking, under a certain load, of a safety bolt (specially worked) that connects the brush arm to the front carriage. Thanks to this safety, the brush arm rotates backward avoiding frontal impact, without breaking the components, with the possibility of immediate restoration by simply replacing the broken safety bolt.*

The front translation carriage connecting the brush arm houses the electro-hydraulic distributor which allows obtaining all the above adjustments. The reason for this choice is to reduce the number of tubes subject to wear on the carriage of the third front brush.
The electro distributor is easily accessible for any maintenance and is provided with suitable external pressure outlet connectable without having to remove the protective bonnet.

FRONT BRUSH ONLY RIGHT OR LEFT (Opt)

It can translate sideways in and out and lift and lower thanks to the control of a manipulator located on an adjustable support located on the side of the door.

Also housed a switch for brush rotation and one for the water control.

The brush unit is fitted with multiple safety systems:

- *automatic and immediate return of translation thanks to a sensor that reads the pressures to which the front brush is subjected in the event of impact.*
- *break of a safety bolt under a certain load*

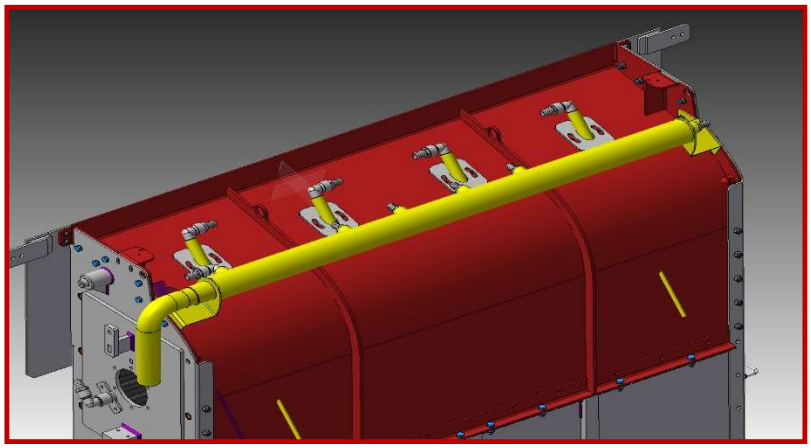
WASTE CONVEYOR

The direct launch of debris is directed by the central cylindrical brush on the vertical vane conveyor that allows conveying the debris inside the waste container.
The outside of the conveyor unit is in high resistance Domex 700 steel, cataphoresis treated, while the upper part of the shell is curved to prevent material build-up, the upper and lower cradle can be removed and thus easily replaced in case of wear.
The conveyor consists of a belts system in parallel that rotate on 2 crowns bolted on an upper dragging shaft, hydraulically controlled, and on two free rollers in the lower part.
Eleven steel supports along the length of the belts support special oil-resistant rubberised fabric and iron blades.

The belts move by means of a hydraulic motor flanged in the top outer part of the shell and calibrated so as to ensure a number of revolutions synchronised with that of the central brush. The belts are of a special type as formed from a single piece, without a connection ring. The material of the belts prevents water aggression or various substances, as well as the wear given by the strong presence of dust. This results in a long life of the belts themselves.

The 2 top crowns are divided into 2 parts so that they can be easily replaced. In the case of occlusion of the conveyor, a special safety valve installed on the hydraulic system sends the circuit in bypass and an immediate signal in the cabin through an audible alarm. The operator, in order to free the occlusion, will have to reverse the direction of rotation of the conveyor by simply acting on the lever in the cabin. Although unlikely, this will still happen due to the interior dimensions of the conveyor which are 49.6 In (1260 mm) wide by 13.8 In (350 mm) in height, which allow the passage of particularly bulky debris.

The Conveyor is also fitted with a system that enables high water flow washing of the belts and blades in order to remove most of the residues accumulated during sweeping.



FINE DUST FILTRATION SYSTEM

The combined collection system entrusts the suction phase with the "dry" collection of volatile dusts; in fact the dust and light particles raised by the cylindrical central brush are sucked through a vacuum created in the container itself by two high-speed hydraulically controlled fans and then retained in the sack filter placed in the container. The air outlet is designed to ensure a "controlled" outflow, thus reducing the noise of the vehicle.

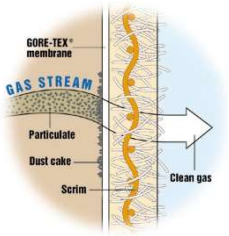
The polyester fabric bags filter has a wide surface of 236.8 ft^2 (22 m^2) that allows long hours of use of the machine without clogging.

Its filtering capacity of about 3 microns also allows the re-entry into the environment of clean air only.

The filtering system also includes a shaking system of the filter activated directly from the driving seat. Hydraulically controlled before the dumping phase, it forcefully shakes the filter and ensures the separation of the dust inside the waste container, thus reducing the need for periodic cleaning.

Alternatively, to the standard bags filter, you can use the filter in GORE®, application patented by Dulevo. This type of filter is the highest technology in terms of performance and filter capacity.

- ***minimised filter maintenance***
  The filtering surface is in fact completely impenetrable by dust particles thus being self-cleaning even in case of an absolute lack of maintenance.
- ***total filtration of Pm10 fine particles above 99%.***
  The Dulevo technology perfects the already exceptional performance of its traditional filters thanks to the application of GORE® filters, reaching filtration standards of particles Pm10, Pm5, Pm2.5 and Pm1 deemed impossible to date.
- ***long-lasting filtration quality***
  the PTFE membrane maintains the filtering quality of the machine, leaving the particulate matter always outside the membrane and preventing its clogging, even partial, in time.
- ***better cleaning quality***
  Thanks to an increase of the air flow of your sweeper of 35% which allows a better suction of dust and lighter waste.



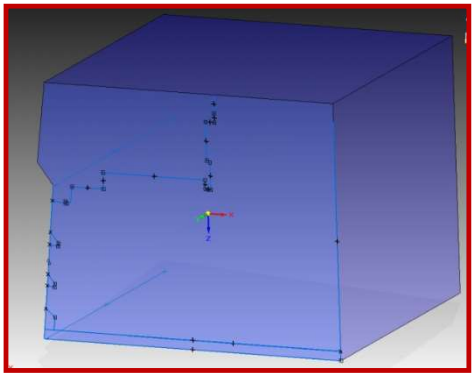
<u>The sweeper 6000 is certified EN15429-3</u> *for treatment of fine dust PM10 and PM2.5*

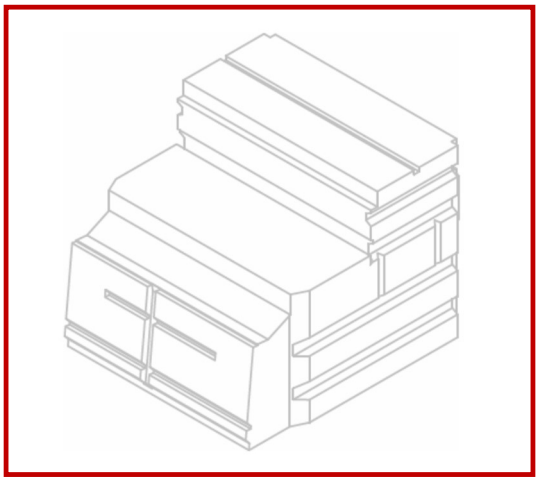
WASTE HOPPER

The watertight waste container is made of AISI 304 stainless steel, and the volumetric capacity of the waste container is 6.1 Yd³ (4.68 m³).

The waste container is equipped with a lifting system formed by a multistage, single acting hydraulic cylinder; it is, therefore, possible to raise the container to any height between 45.3 In (1150 mm) and 94.5 In (2400 mm).

The waste container is unloaded by tilting operated by a double acting hydraulic cylinder that allows a tilting angle of about 45°.





Both the lifting and the tilting systems of the container are protected by safety check valves in case of pressure drops. The lifting system of the container is also fitted with two mechanical stops for maximum safety during maintenance in the area underneath the waste container.

The container dumping door is positioned at the back; it is closed by means of two double acting hydraulic cylinders. With the door closed, the cylinders create a mechanical dead point that prevents opening the door in case of pressure drops in the hydraulic circuit.

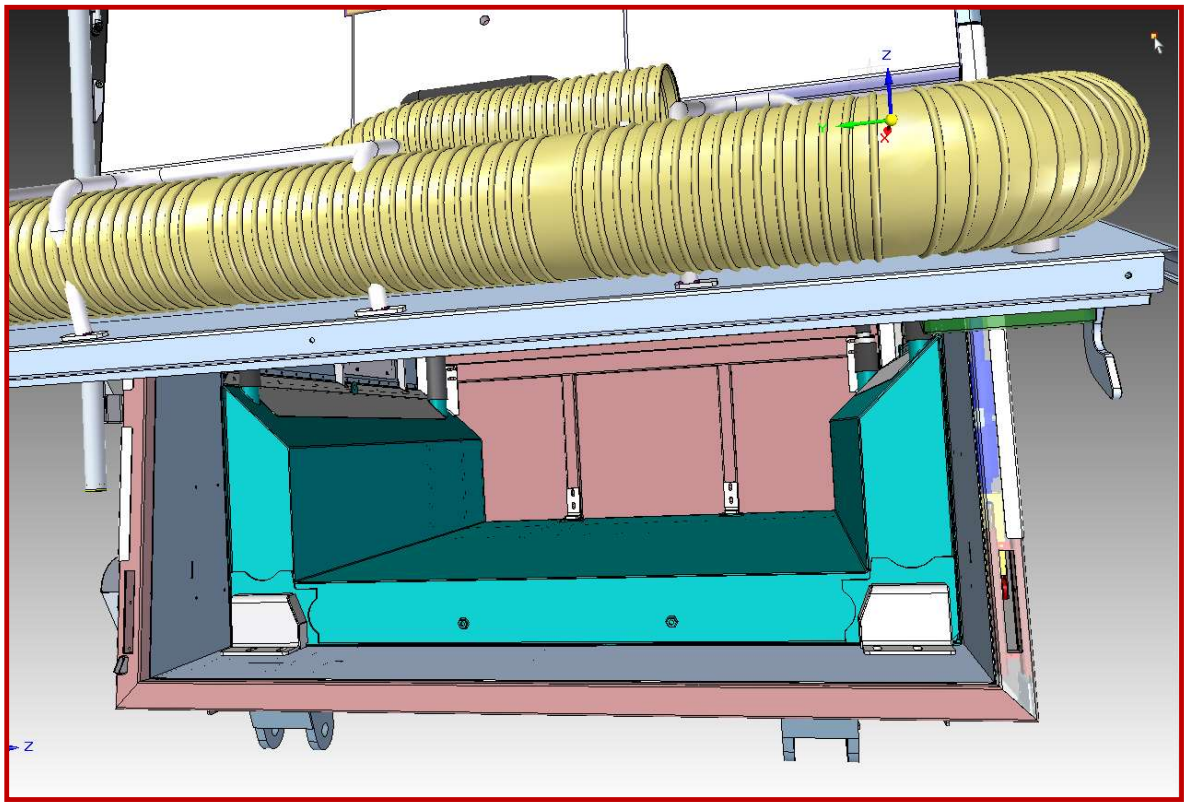
During dumping, the container, positioned at its maximum height, protrudes from the rear bumper edge by more than 27.5 In (700 mm), providing the operator with wide manoeuvring spaces and without the inconvenience of debris coming out around the dumping zone.

All waste container dumping operations are indicated by three special warning lights in the cabin.

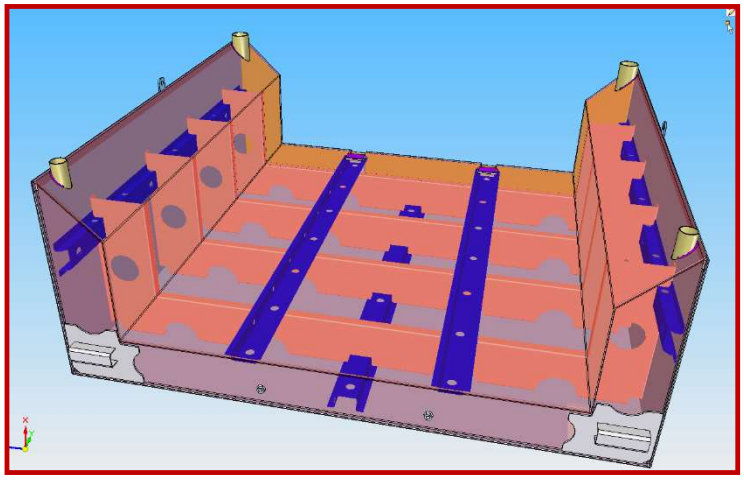
The rear dumping door is fitted with a mechanical stop that keeps the same door open during washing of the waste container.

The rear door opening occurs via a hydraulic cylinder that is controlled in the cabin

SUPPLEMENTARY WATER TANK (Opt)



On the D6, an additional tank can be installed with a capacity of 171.8 Gal (650 litres), which together with the 105.7 Gal (400 litres) of the main tank provide a water reserve of 277.7 Gal (1050 litres).
The tank and its positioning have been designed to have a perfect compromise between the occupied space and the water reserve available to perform the various functions available on this machine version.
Its shape has been designed to ensure that the material loaded from the conveyor does not accumulate and that the discharge is not obstructed.
ribs and ridges have been placed inside it to guarantee the machine, on the one hand, more driving stability, preventing water splashing on the walls, and on the other structural strength and seal.

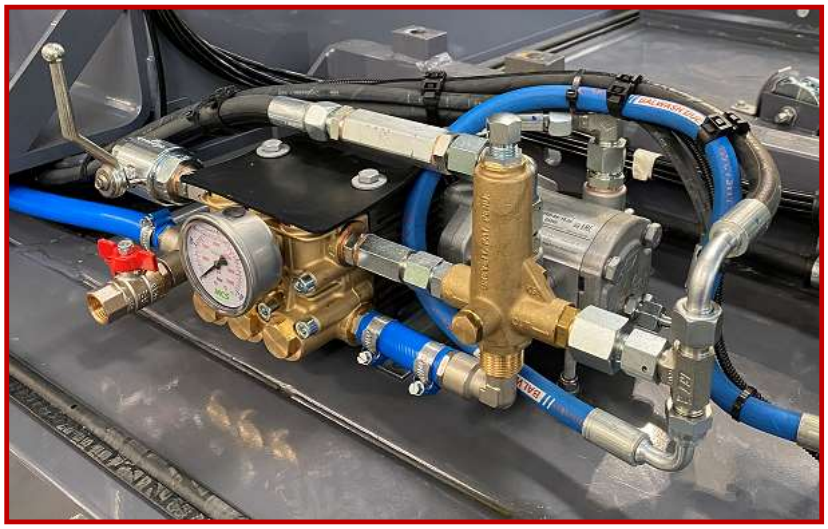


The vents are located at the top of the tank near the narrower section, so the tank is practically filled to the limit of its capacity.

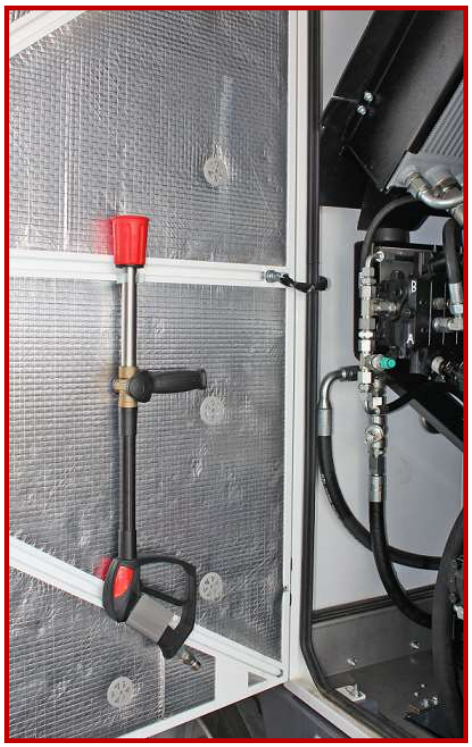
HIGH PRESSURE WATER SYSTEM (Opt)

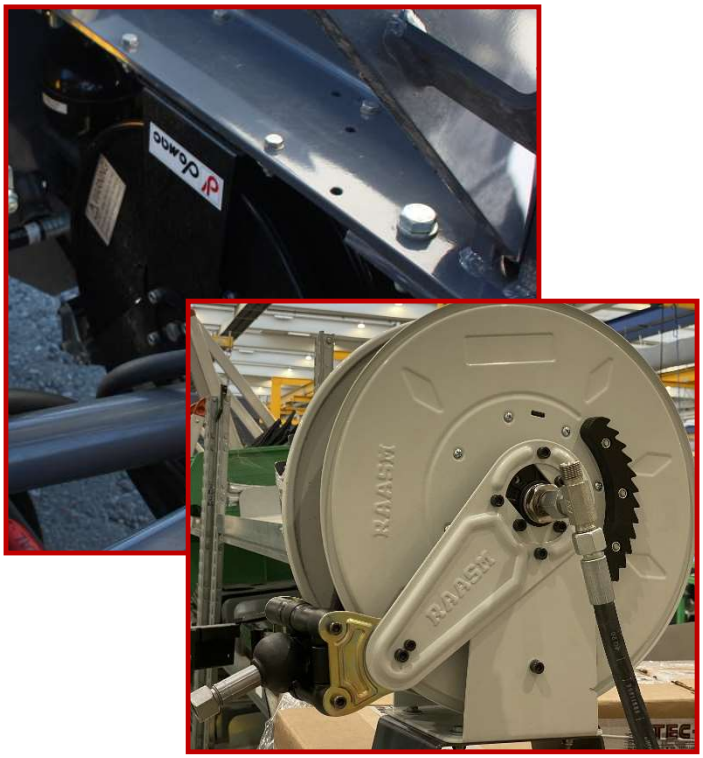
The D6 sweeper can be equipped with a high pressure system.

The pump with 2900 Psi (200 bar) nominal pressure and 5.6 Gal/min (21 l/min) flow rate, activated by a control on the cabin's central display, feeds the high-pressure circuit services.



In the rear part of the machine there is an automatic reel (to recover the tube), with a tube of about 33 ft (10 metres) long. The high-pressure water gun nozzle is housed on the left side door.





The high-pressure system can also be used for other applications such as:

- *A 7-nozzle washing bar placed on the back of the machine having a washing path of 6.9 ft (2100 mm). Alternatively, assembly in the front of the frame in front of the wheels is also possible.*

- *A facilitator arm for easier washing jet pipe operations, in case it is necessary to bypass obstacles such as parked vehicles.*
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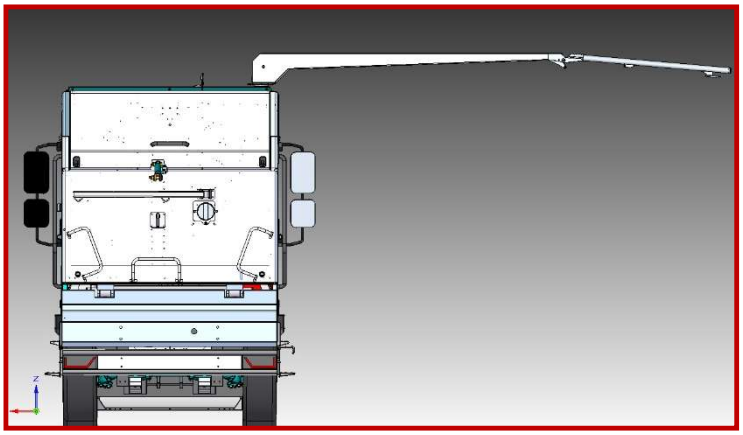


- *Dust removal system during the unloading phase. The sides of the container feature two bars, each of which is equipped with 4 nozzles which spray water in order to contain the dust generated by the dry waste present inside.*

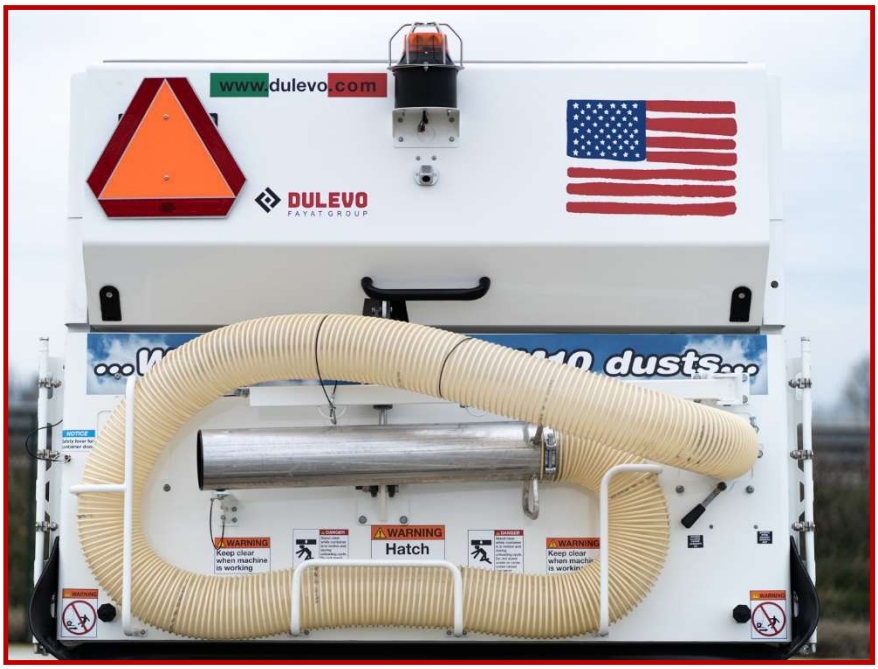
DEBRIS SUCTION (Opt)

The suction system described above allows equipping the machine with a rear debris suction pipe able to perform suction operations in wells and storm drains.

The polyurethane flexible hose has a diameter of 6 In (150 mm), a length of 177.2 In (4.5 m), and is equipped with rigid aluminium terminal complete with support handle.

A damper located on the vertical conveyor allows sealing the waste container during the use of the debris suction pipe in order to increase the vacuum.
Opening and closing of the damper easily takes place from the ground by simply acting on the rod placed laterally to the vertical conveyor.

The head of the system in operation is about 38 In (965 mm) in H_2O column, while the maximum capacity is about 6538.6 Yd^3/h (5000 m^3/h).



The debris suction pipe can also be equipped with a water kit, which performs washing together with the suction operation or facilitates the function.

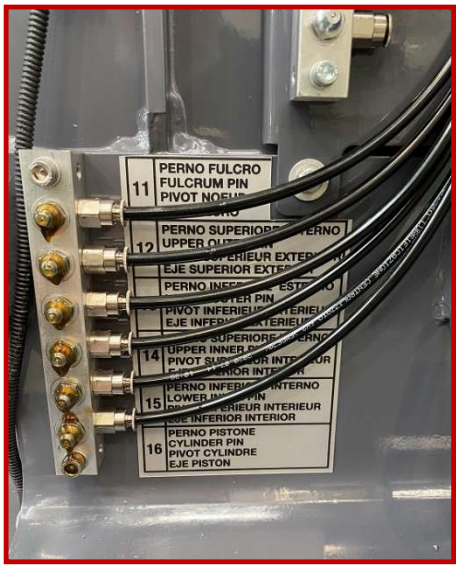
GREASING SYSTEM (Opt)

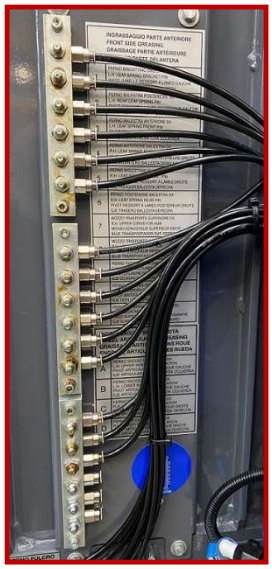
Based on the configuration, the sweeper can have up to 33 greasing points that allow to keep the parts most subject to wear (cylinders, pins, etc.) efficient.

Greasing can be carried out by the maintenance engineer, manually on each individual point, or three types of centralised greasing are available as Optional.

Centralised manual greasing system.

On the right and left side of the transport, the greasing points are grouped by special pipes





Centralised greasing system with manual pump

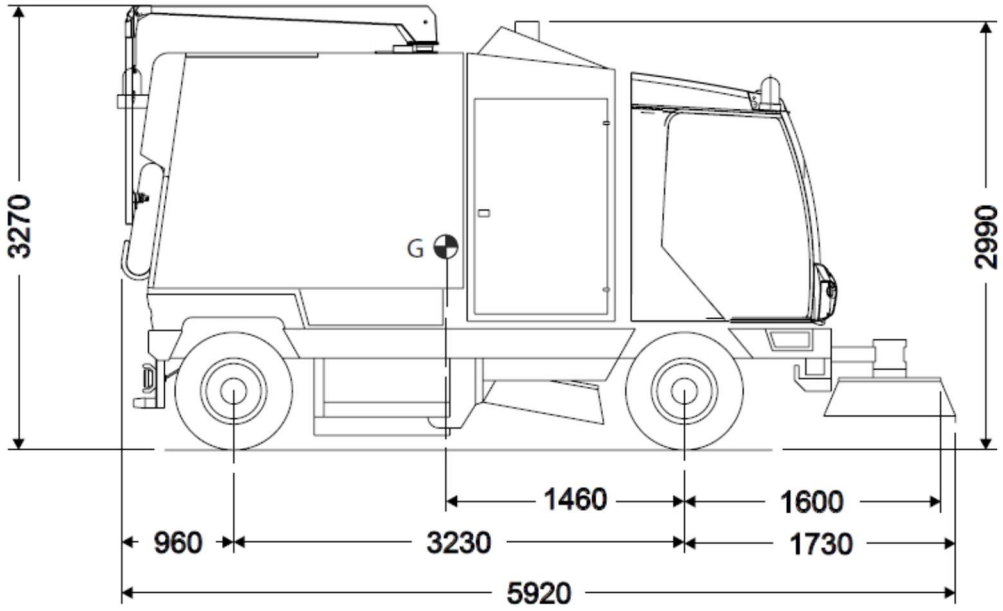
The system is supported by a manual pump connected to the grease tank

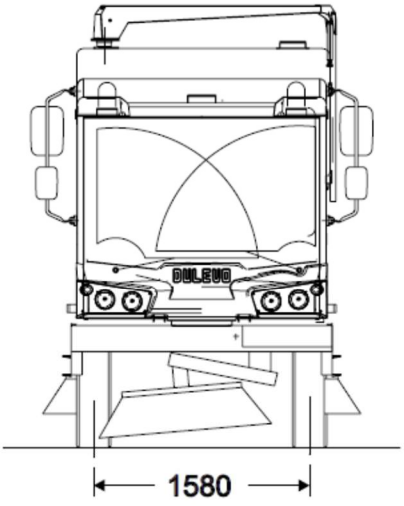
Automatic centralised greasing system with electric pump

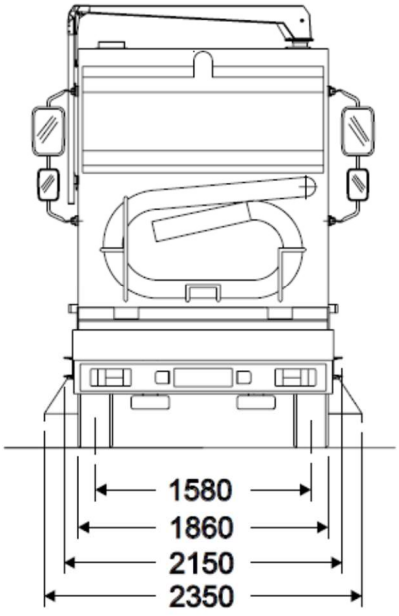
The system is supported by an electrically powered automatic pump which always keeps the system greased.

SIZE AND WEIGHT

Length	*204.4 In*	*(5190 mm)*
Length with third brush	*233.1 In*	*(5920 mm)*
Width	*92.6 In*	*(2350 mm)*
Maximum height	*117.8 In*	*(2990 mm)*
Pitch	*127.1 In*	*(3230 mm)*
Tare	*16754 lbs*	*(7600 Kg)*
Capacity	*11684.4 lbs*	*(5300 Kg)*
Overall weight with third brush	*28990.4 lbs*	*(13150 Kg)*







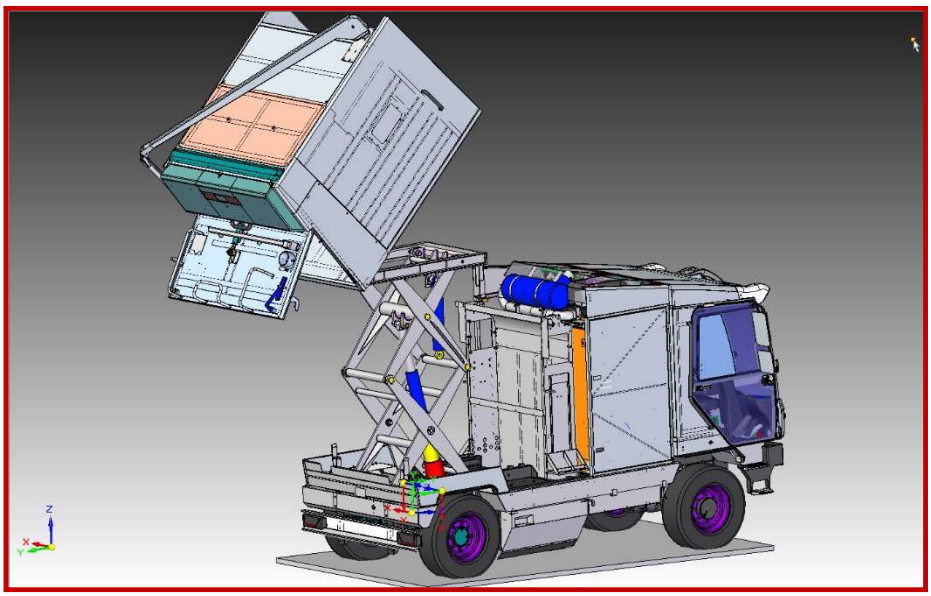
HIGH DUMP 118 In (3 Metres)

The waste container is made of AISI 304 stainless steel and has a volumetric capacity of 5.2 Yd³ (4 m³).

The waste container is equipped with a lifting system formed by a multistage, single acting hydraulic cylinder; it is therefore possible to raise the container to any height between 52.8 In (1340 mm) and 118.2In (3000 mm). The waste container is unloaded by tilting operated by a double acting hydraulic cylinder that allows a tilting angle of about 45°.

Both the lifting and the tilting systems of the container are protected by safety check valves in case of pressure drops. The lifting system of the container is also fitted with two mechanical stops for maximum safety during maintenance in the area underneath the waste container.

The container dumping door is positioned at the back; it is closed by means of two double acting hydraulic cylinders. With the door closed, the cylinders create a mechanical dead point that prevents opening the door in case of pressure drops in the hydraulic circuit.
During dumping, the container, positioned at its maximum height, protrudes from the rear bumper edge by more than 27.5 In (700 mm), providing the operator with wide manoeuvring spaces and without the inconvenience of debris coming out around the dumping zone.
All waste container dumping operations are indicated by three special warning lights in the cabin. The rear dumping door is fitted with a mechanical stop that keeps the same door open during washing of the waste container.



SAFETY DEVICES

The 118 In (3 m) sweeper is equipped with safety devices which prevent the operator from being in potentially hazardous situations and to always operate in safe conditions. The drain function is subordinated, and accepted, only when all safety defined parameters are checked.
Machine stability is ensured by gravitational sensors which are able to determine the lateral and longitudinal inclination.
When the sweeper exceeds the 4 degrees of lateral inclination or 11 decrees of longitudinal inclination limit, lifting controls are disabled.
Stability is also ensured by limiting speed during the unloading stage.
Lifting is also disabled when the load exceeds the maximum value permitted or when the parking brake is not engaged. When the sweeper is started in a condition of container raised, it automatically goes in unloading stage, limiting speed.

REAR BUMPER

The large sized rear bumpers solution enables to aid the draining function, avoiding damaging both the support structures: collection containers, satellite truck, etc., and the sweeper structure.

MASSES

Tare	*19532.7 lbs*	*(8660 Kg)*
Capacity	*4960.4 lbs*	*(2250 Kg)*
Overall weight with third brush	*24493 lbs*	*(11110 Kg)*