

TRIOLIET MULLOS B.V.

Mixer Feeder

SOLOMIX 1 Typ 1000 VL

Test Report 4907



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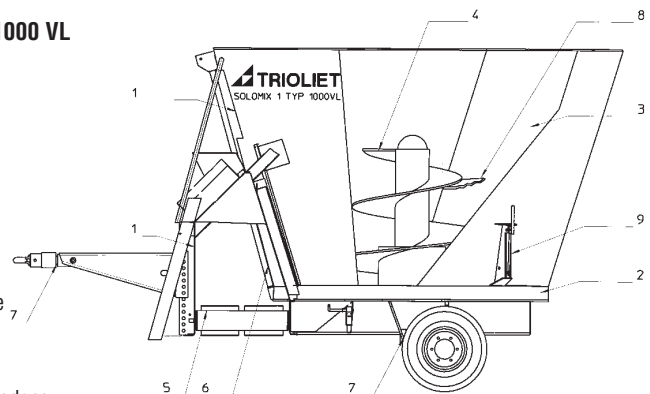
Deutsche Landwirtschafts-
 Gesellschaft e.V.
 Prüfstelle für Landmaschinen

Brief description

- Trailed, single-axle mixer feeder;
- mixing auger driven by tractor PTO shaft;
- hydraulic components driven by tractor hydraulics;
- mixing hopper with vertical mixing auger with exchangeable blades;
- two hydraulically folding opposite cutting edges and hydraulically actuated dosing gate valve on mixing hopper;
- discharge conveyor on both sides fixed at front end, with rubber belt;
- electronic weighing device with three weighing rods.

System sketch SOLOMIX 1 Typ 1000 VL

1. Window
2. Wear edge
3. Mixing hopper
4. Mixing auger
5. Discharge belt
6. Dosing gate valve
7. Weighing rods
8. Blades
9. Opposite cutting edges



(See page 7 for description and technical data)

Assessment – Summary

Test feature	Test results	Assessment
Filling		+
Unloading performance	External filling	
Mixing		+
Mixing precision	self-loader grass/maize chopped grass/maize maize/pellets	
– half-full	2.7 % 1.5 % 1.3 %	+ / + / +
– full	1.9 % 2.4 % 0.8 %	+ / + / +
Mixing time	short; after filling 3 min.	+
Chopping effect	good; mashing can be ruled out	+ / + +
Weighing		+
Weighing device	can be used during filling when mixer feeder is hitched	○
Precision (max./min. payload)	1 resp. 4 % deviation from true filling weight	+
Display	swivels; illuminated	+ / +
Feed discharge		+
Ejection performance	very high	++
Swath deposit	Swath is sometimes driven over	○
Emptying	slight feed residues on vertical auger	○
Handling		+
Hitching	can be done quickly	+
Operation	simple; easy to reach	+
Shunting	no view to rear	–
Feed discharge	can be observed well from driver's seat	+
Power requirement		++ / + +
Mixing	self-loader grass/maize chopped grass/maize maize/pellets	
– maximum	40 kW 27 kW 33 kW	
– fast stage specific	10.5 kW/t 7.8 kW/t 6.1 kW/t	++ / + + / +
– slow stage specific	7.1 kW/t 5.2 kW/t 4.2 kW/t	++ / + + / + +
Maintenance		++
Lubricating points	15 (for intervals see page 6)	++
– Accessibility	15 freely accessible	++
– Time input	18 man-minutes in 100 hours of operation	++
Transmission oil	SAE 90; SAE EP 220	○
Operating guide/Spare parts list	detailed and clear	+
Durability		+
Endurance test on the test rig	no damage; after modification by the manufacturer	+
Practical use	no damage to mixing and distribution organs	+
Operational safety		inspected by DPLF
Road safety		Road traffic licensing regulations observed; max 6 km/h

Rating scale: ++ / + / ○ / – / -- (○ = Standard); during mixing: + / ○

Test results

The SOLOMIX 1 Typ 1000 VL allows homogenous feed mixes to be prepared and distributed.

The mixing hopper has a volume of 10 m³. Standard commercial wheeled and front loaders or mobile cranes with appropriate loading tools can be used for filling.

The mixing system consists of a vertical mixing auger which is generally known for its gentle treatment of the feed. The outstanding feature is the belt conveyor mounted at the front side with adjustable discharge speed and for feed discharge to the right or the left.

In order to ensure clean feed intake, clamp silos should be secured with a base plate.

The SOLOMIX 1 Typ 1000 VL tested is equipped with a hydraulic service brake. When driving over public roads and paths it should be noted that the maximum speed allowed is only 6 km/h.

Filling

The oval hopper opening of the SOLOMIX 1 Typ 1000 VL is sufficiently large for filling. The funnel-shaped mixing container is easily accessible from the sides and rear of the vehicle. The filling performance depends on the loading technology used.

Care should be taken to ensure correct handling already when filling the SOLOMIX. The mixer feeder reacts sensitively if it is not standing horizontally. We noted that when the mixer feeder stands on a slope and the mixing hopper is full, feed stops at the front or rear side.

Complete round or square bales are passed into the mixing hopper from above and processed.

The SOLOMIX needs just five minutes to break up and crush a



Figure 1: The mixing operation can be observed from the driver's seat through the inspection window up to a certain degree of filling.

grass silage round bale with a diameter of 1.2 m (420 kg, DM 46 %). It is advisable to use the hydraulic opposite cutting edges in order to achieve a better cutting action.

Mixing

The SOLOMIX 1 Typ 1000 VL achieved good mixing precision for all mixing variants tested and is thus above the average standard. Full and half-full hopper mixes were examined. The maximum admissible deviations of 10 % for basic feed and 5 % for feed concentrate (photos 2 to 4) were observed. The mixing time after addition of the last components was limited to three minutes.

Optimal Mixing Cycle

An impressive feature of the SOLOMIX is how well the feed is mixed in the mixing hopper. Even after small quantities are added the feed is perceptibly drawn into the mixing cycle.

This continues independently of the filling level throughout the entire filling process, as is reflected clearly in the mixing precision too.

The cutting performance effect of the SOLOMIX is good. It is worth noting that in general it is possible to do without the hydraulic opposite cutting edges. It is only advisable to use opposite cutting edges for long feed structures and compact feed blocks. This produces better and faster breakdown and optional cutting.

The feed treatment by the vertical mixing auger is convincing. The feed is mixed gently even when it consists of damp and weakly structured components. Mash formation can be ruled out.

Round and square bales can be mixed in well and quickly.

Adding components in the correct sequence helps to shorten the mixing time and improve mixing precision sustainably.

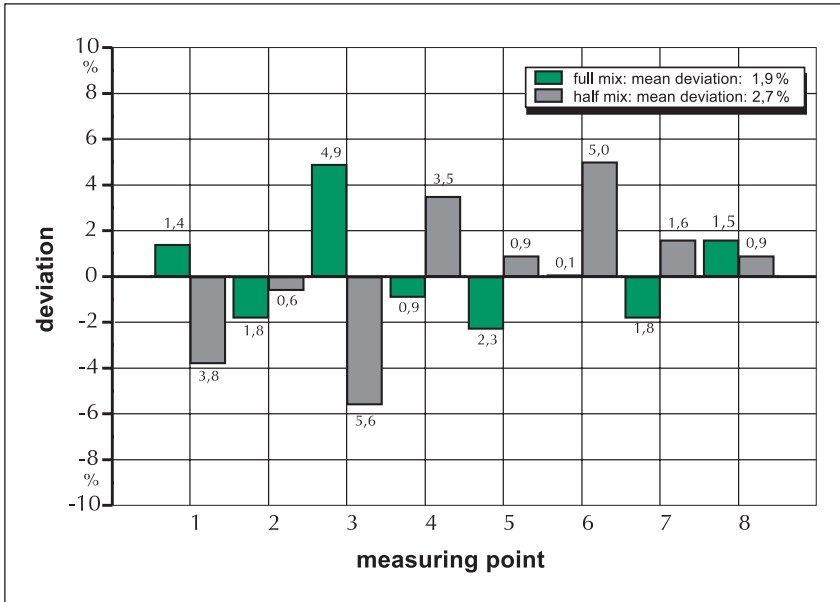


Figure 2:

Deviations when mixing self-loader grass/maize full/half-full

Mean deviation: 1.9/2.7 %.
 Mix: 2765/1230 kg;
 DM 38.1/35.3 %
 Grass silage: 1580/770 kg;
 DM 46.1/40.0 %
 Maize silage: 1185/460 kg;
 DM 27.6/27.5 %

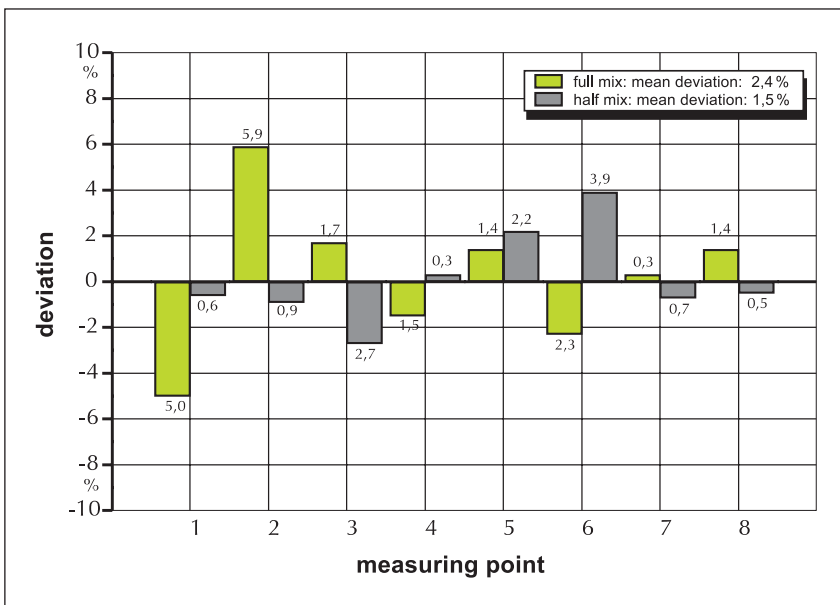


Figure 3:

Deviations when mixing chopped grass / maize – full/half-full;

Mean deviation: 2.4/1.5 %.
 Mix: 2780/1170 kg;
 DM 37.9/35.2 %
 Grass silage: 1970/870 kg;
 DM 35.9/31.6 %
 Maize silage: 810/300 kg

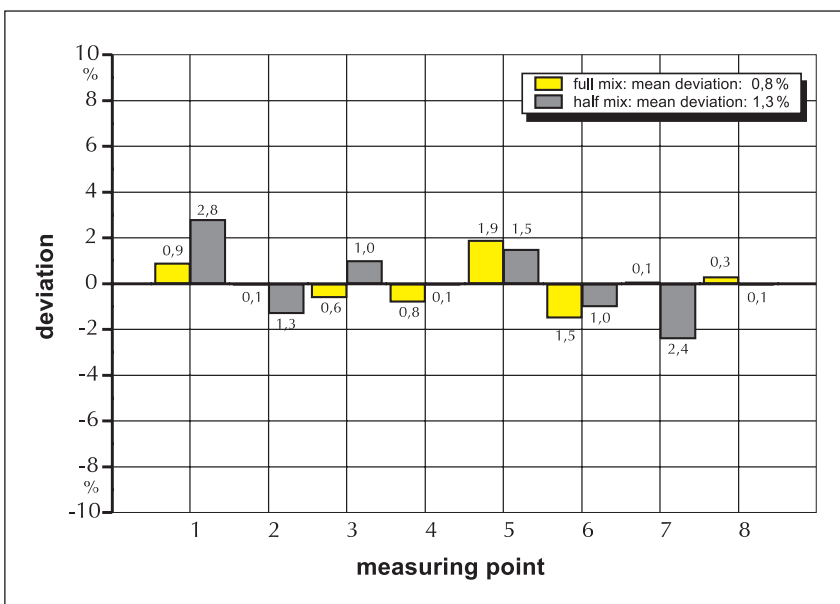


Figure 4:

Deviations when mixing maize/dried sugar beet pulp (pellets) – full/half-full;

Mean deviation 0.8/1.3 %.
 Mix: 3680/1640 kg;
 DM 36.8/37.5 %
 Maize silage: 3200/1440 kg;
 DM 29.3/30.2 %
 Dried sugar beet pulp: 480/200 kg;
 DM 86.9/89.7 %

Weighing

The SOLOMIX 1 Typ 1000 VL is clearly distinguishable from other mixing wagons at first sight thanks to the arrangement of its three weighing sensors. Two are mounted directly on the axle and one in the drawbar at the towing device. Accordingly, when the wagon is unhitched, the weighing display cannot be used¹⁾. We did not note any particularly conspicuous results as regards weighing precision. The deviations from a minimum quantity of 100 kg were 4 %, depending on the filling weight. With maximum payload a deviation of 1 % was ascertained.

The weighing computer is mounted in the middle on the front side of the wagon on a flexible arm. The flexible arm can be swivelled to the left or the right side. Thus the weight display can be observed from the driver's seat and from both sides. The display is illuminated and the 25 mm-large digits can be seen clearly. Digit heights of up to 50 mm would be desirable so that the weight display during external filling can be seen from a relatively long distance too.

Feed Discharge

The feed discharge is comparatively even. It is noteworthy that the belt conveyor discharge speed can be adjusted. Following a certain working-in period a relatively uniform feed discharge can be achieved across the entire discharge section. The discharge quantity can be adjusted via the position of the dosing gate valve, the driving speed and the rotational speed. It is remarkable that a complete wagon mix can be discharged within two minutes. It is advisable to work with an elevated PTO shaft speed (1000 min⁻¹) for a brief period at the end of discharge in order to

¹⁾ According to the information supplied by the manufacturer a hydraulic jack with weighing rod can be supplied on request.



Figure 5:
The discharge speed of the conveyor belt can be adjusted individually by the choke valve.

remove all feed residues from the auger and hopper base.

During discharge of large feed quantities (feeding once per day) feed is sometimes driven over. No feed deposits/accumulation were ascertained on the belt conveyor. The side belt covers are certainly one reason for this. The smooth running noise of the belt is an advantage over chain conveyors.

There is a scale for the dosing gate valve on the mixing hopper ranging from 1 to 8. It is mounted in an easily visible position at the head end of the mixer feeder within the driver's field of vision. We are pleased to note that the scale graduations are further sub-divided into half degrees and marked. In practical use the discharge quanti-

ties were always regulated with fully opened gate valve via the engine rotational speed and driving speed.

Handling

Handling of the SOLOMIX 1 Type 1000 VL is easy, as is generally the case for externally filled wagons. We are pleased to note that the few control functions can be actuated via an electrical switch box. The switch box has all the advantages of a modern control unit. It is compact in size and therefore easy to handle. The toggle switches can be operated simply and directly from the driver's seat. The inspection window on the front side of the mixing hopper is also an advantage. Up to a certain filling level it is

Table 1: Power requirement of the SOLOMIX 1000 VL

Feed components	Mix kg	DM Content %	Max. power requirement kW		Specific power requirement kW/t	
			slow	fast	slow	fast
Mixing			slow	fast	slow	fast
Self-loader grass/maize	2860	38.1	20	40	7.1	10.5
Chopped grass/maize	2450	36.2	13	27	5.2	7.8
Maize / dried sugar beet pulp	3745	33.8	16	33	4.2	6.1

- **Hitching – can be carried out quickly:**
 - tractor hitch, couple articulated shaft,
 - connect hydraulic lines,
 - retract hydraulic jack,
 - fasten switchbox in tractor cab,
 - connect electrical and brake connections.
- **Operating of all functions – simple; easy to reach:**
 - as standard via electrical switchbox in driver's cab,
 - the mixing auger is started by switching on the articulated shaft,
 - the hydraulic components are started by switching on the tractor hydraulics.
- **Filling of the SOLOMIX 1 Typ 1000 VL – can be done without hindrance:**
 - vehicle rear cannot be observed,
 - hopper opening sufficiently large,
 - filling possible from three sides.
- **Feed discharge – can be monitored well:**
 - on both sides at front on hopper, can be seen well from driver's seat,
 - position of dosing valve can be checked well from driver's seat by scale on front side of wagon,
 - fine scale from 1 to 8 is clearly visible; scale and indicator are relatively far apart; indicator should be marked more clearly,
 - complete emptying possible with elevated PTO rotational speed (1000 min⁻¹).

Overview 1: Handling

possible to follow the mixing operation directly from the driver's seat. However, this does not apply when the mixing hopper is full since the feed conceals vision.

Power requirement

The power requirement of the SOLOMIX 1 Typ 1000 VL is very low. The power requirement can be reduced further by a good 1/3 if a reduction gear (option) is connected.

The power requirement depends essentially on the structure of the feed and the transmission ratio with which the mixing auger is driven. At a tractor PTO rotational speed of 540 min⁻¹ the mixing auger turns 32.6 times, or with a reduction gear 23.2 times. The measured results are shown in Table 1.

Maintenance

The maintenance requirement of the SOLOMIX 1 Typ 1000 VL is

very low. The service intervals of the different lubricating maintenance points are specified in the operating instructions after 8, 20, 50 and 200 hours of operation. Table 2 shows the necessary maintenance work for lubrication.

The operating instructions essentially describe work with the

Table 2: Maintenance work

Maintenance work	Number / quantity
Lubricating points	15
– freely accessible	15
– accessible in upright position	5
– to be supplied after approx. 8 hours	6
– time input for lubricating per 100 hours of application	18 man-minutes

Table 3: Durability

Durability	Requirements
of the vehicle chassis during permanent testing on the vehicle test rig	satisfied ¹⁾
of the mixing and distribution elements in practical use	good ²⁾

1) After modification by the manufacturer the tyres (27x7.75 – 15 14 PR after 235 – 75 R 17.5 18 PR) were changed.

2) After so far 534 mixing operations in practical use.

Note: Chassis examination according to DLG Test Programme with admissible total weight.

vehicle. In the section Maintenance and Lubrication not all lubricating points are listed and described. The spare parts list is clear.

! Bio-degradable oil can be used by consultation with the manufacturer.

Results of survey

In a practical survey 12 farms were questioned about their experience with the SOLOMIX. Most of the mixer feeders had been purchased in the last 18 months. The oldest unit was purchased in August 1997.

Our test results were confirmed many times over by the farmers. They all managed well with the feed discharge after a certain period of familiarisation. Generally they worked with the 1000 PTO shaft briefly to empty the hopper completely. Some of them complained that dirt can accumulate between the twin tyres and feed is lost in the feed passage in the barn. The power requirement was rated differently. Replies ranged from low and slight to high. No machine wear has been ascertained yet. The very low maintenance input was rated positively. TRIOLIET replaced the gear unit and exchanged it free

Description and technical data (measured values)

Design

– trailed mixer feeder	
– PTO rated speed	540 min ⁻¹
– hydraulic control valves required on tractor	1 double-acting, 1 single-acting
– operation	electro-magnetic
– service brake	hydraulic
– admissible maximum speed	6 km/h
– jack	hydraulic

Hopper

– capacity	10 m ³
– top opening, length x width	3200 mm x 2020 mm
– material thickness and type	
– side wall	6 mm, St 37.2
– wear edge (thickness x height)	10 mm x 110 mm, St 37.2
– bottom	15 mm, St 52.3

Mixing system

– vertical mixing auger	1, 2 1/2 windings, with 6 exchangeable blades, geared drive, right-handed
– material thickness and nature	12 mm, St 52.3
– rotational speed (min/max)	23.2/31.3 min ⁻¹
– reduction gear	1:1,35
– opposite cutting edges	2, hydraulically folding

Weighing device

– Fancom F.star 150	
– display	on articulated arm; illuminated
– digit height	25 mm
– storable mix recipes	none
– possible components during loading/portioning during feed discharge	none
– target quantity display	none
– number of weighing rods	3
– weighing during filling	yes, if mixer feeder is hitched

Discharge

– mounted at front end, fixed belt conveyor, discharge on both sides	
– height above carriageway	570 mm
– discharge aperture, width x height	970 mm x 900 mm
– dosing valve	hydraulically actuated

Gear oil, filling quantities

– main gear, SAE EP 220	10.5 l
– reduction gear, SAE 90	6.0 l

Options (tested)

- reduction gear, electrical remote control, hydraulic opposite cutting edges, hydraulic jack, speed regulator for belt conveyor, lighting, licensing in accordance with road traffic licensing act.

Options (not tested)

- air brake system, electronic weighing device in various models, tow-bar eye for hitch connection, hydraulic jack with weighing rod, adjustable conveyor belt extension, double conveyor belt for feed discharge on both sides, rear discharge belt.

Principal dimensions and weights

Length	4770 mm	Track outer dimension with tyres quoted	1950 mm
Width	2300 mm	Ground clearance	240 mm
Height, in transport/working position	2740 mm	Admissible total weight	7500 kg
Tow-bar eye; height (jaw, adjustable)	850 mm	Empty weight	3560 kg
Tyres	twin tyres GOOD-YEAR 27x7.75 – 15 14 PR	Payload	3940 kg
Track width	1500 mm	Admissible drawbar load	1000 kg

of charge on four older machines from a certain series.

The farmers have been very satisfied so far with the after-sales service.

All the farmers questioned were partly very satisfied with the mixer feeder and would buy it again.

Operational safety

The Mixer Feeder SOLOMIX 1 Typ 1000 VL has been inspected by the testing agency Deutsche Prüfstelle für Land- und Forsttechnik (DPLF). There are no safety-specific reservations regarding its use.

Roadsafety

In the model tested the SOLOMIX 1 Typ 1000 VL was equipped with a hydraulic service brake.

Tests

The tests were carried out in accordance with the DLG test schedule for feeder mixers.

One mixer feeder was available for tests during the feeding season 1999. Altogether 534 loads with altogether about 790 t feed were mixed and dispensed. The maximum payload was 4900 kg. Thus the stated payload was exceeded by 25 %.

Tests performed by

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