STATENS MASKIN-PROVNINGAR

NATIONAL MACHINERY TESTING INSTITUTE

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TEST BULLETIN: OECD No. 1034

Date of approval 1986-12-18

REPORT ON TEST IN ACCORDANCE WITH OECD TEST CODE FOR THE OFFICIAL TESTING OF AGRICULTURAL TRACTORS

AGRICULTURAL TRACTOR VALMET 2005 (4 WD)

Manufactured by: Volvo BM AB, Eskilstuna, Sweden

Test No. 7244

Test bulletin: OECD No. 1034

Agricultural tractor Valmet 2005 (4 WD)



This bulletin is based on engineering tests in accordance with the OECD Tractor Code.
It does not contain an evaluation of the performance of the tractor on practical farm work.

TABLE OF CONTENTS

	Page No.
SPECIFICATION OF TRACTOR*	4–12
CONDITIONS DURING TEST	12
FUEL AND LUBRICANTS USED IN TESTS	13
COMPULSORY TESTS	
1 Main power take-off performance	14–15
2 Power lift and hydraulic pump performance	15–16
3 Drawbar performance	16–18
4 Turning space and turning circle	18
5 Location of centre of gravity	18
6 Braking	19
7 Measurement of external noise level	19
8 Noise measurement at the driver's ear	20

* All specified dimensions refer to the tyre sizes 16.9 R 28, load index 136 A8, at front, 20.8 R 38, load index 153 A8, at rear and the track width 1840 mm at front and 1920 mm at rear.

Tractor manufacturer's name and address:	Volvo BM AB, Eskilstuna, Sweden by order of Scantrac AB, Eskilstuna, Sweden and Valmet AB, Jyväskylä, Finland
Submitted for test by:	Scantrac AB, Box 1102, S-631 80 Eskilstuna, Sweden
Selected for test by:	Scantrac AB with the agreement of the testing station
Place of running in:	Scantrac AB, Eskilstuna, Sweden
Duration of running in:	60 hours
Location of test:	National Machinery Testing Institute, Uppsala, Sweden

Specification of tractor

Tractor

Make	Volvo BM
Trade name	Valmet[1]
Model	2005 (4 WD)
Type	Four wheel driven, unit construction
Serial No.	20501
First serial No.	20001

Engine

Make	Volvo
Model	TD 60 B
Type	Turbo-charged, 4-stroke, direct injection, diesel engine, water cooled
Serial No.	93763
Cylinder No.	6
Disposition	Vertical, in-line
Bore/Stroke	98.4/120.0 mm
Capacity	5.480 dm^3
Compression ratio	16:1
Arrangement of valves	overhead
Cylinder liners	wet, replaceable, centrifugally cast iron liners

Supercharging

Make	Garret/A i Research
Model	TO 4B 46
Type	Exhaust type turbo-supercharger
Pressure	100 kPa

Fuel system

Type of fuel feed	Mechanical, piston type fuel feed pump, Bosch FP/K 22 MW 18
Make and type of fuel filters	2 filters, Bosch replaceable cartridge filter connected in parallel
Fuel tank capacity	210 dm^3
Make, model and type of injection pump	Bosch PES 6 MW 100/320 RS 1004 in-line
Serial No.	552 35495
Manufacturer's production setting of injection pump	94–96 mm^3 per stroke at full load and 700 rev/min of the pump at full injection rate
Flow rate injection timing	22° before T.D.C.

[1] Up to January 1st, 1986 the trade name was Volvo BM Valmet.

Make, type and model of injectors	Bosch, multihole DLLA 150 P 30
Manufaturer's production setting	23,5 MPa

Governor

Make	Bosch
Type	Mechanical, incorporated in fuel injection pump
Model	RQV 300-1150 MW 8/2
Governed range of engine speed	From 550 + 50 to 2500 + −50 rev/min
Rated engine speed	2300 rev/min

Air cleaner

Make and model	Mann -20325/2 Hummel CF 1000 (safety cartridge)
Type of cleaner	Dry paper air cleaner including replaceable paper element
Location of air intake	Trough bonnet behind the engine
Maintenance indicator	Electric (warning lamp)

Exhaust silencer spark arrester

Make and model	Volvo BM, Reverse Flush 260/152 V 650
Type	Expansion chamber type
Location	Vertical through bonnet on left hand side, debouch 3.40 m above ground

Lubrication system

Type of feed pump	Forced feed from gear type pump with metal strainer in oil sump
Make and type of filter	Full flow oil filter with replaceable paper element

Cooling system

Type	Water cooled, impeller assisted by centrifugal pump, 580 mm dia 6-blade belt driven fan
Coolant capacity	26 dm^3
Means for temperature control	Thermostat
Pressure	50 kPa

Starting system

Make	Bosch
Model and type	JD 12V4. Electrical, solenoid starter motor, 3 kW
Cold starting aids	Electromagnetically controlled for max. fuel injection. Starting element in induction manifold
Safety device	Starter interlock, gear in neutral position and clutch pedal released

Electrical system

Voltage	12 V
Generator	
Make	Bosch N1–14V29/90 A
Type	Alternator
Power	1260 W
Battery	2 accumulators in parallel
Capacity	140 Ah at 20 h rating

Transmission	
Clutch (only for travelling)	
Make	Automotive Products Ltd
Type	Dry, single acting, mounted on engine flywheel operating primary shaft of gear box
Model	15" AS, coil spring loaded
Number of plates	One, rigid with carametalix buttons
Diameter of disc	350 mm
Method of operation	Foot pedal, mechanically with servo by overcentre spring
Gearbox	
Make	Volvo BM
Type, arrangement	Mecanical, sliding gear, constant mesh. Main gearbox operated by hand lever with 4 forward speeds and 1 reverse speed combined with one hand lever operated high–low transfer gearbox. Power shift hydraulically operated by electro-switch
No. of speeds	totally 16 forward and 4 reverse
Options	On certain markets 14th and 16th speeds are blocked due to local speed regulations
Type of oilfilter (power shift)	Full flow replaceable paper element
Recommended oils	See end of chapter "Specifications"
Rear axle and final drive	
Make	Volvo BM
Type	Bull gear axle with axle tubes mounted to a centre housing, containing differential crownwheel and pinion and spur gear final drives mounted to the gear box
Differential lock	Mechanical, dog clutch between rear axle halves. Electrohydraulically operated ram engages and disengages the dog clutch
Front axle and final drive	
Make and model	ZF, APL 355
Type	Mechanical, driven from bottom of gearbox by drop-down gearbox and two gears and a universal joint shaft. Axle with crown wheel and pinion and planetary final drives in wheel hubs
Differential lock	Limited slip, self-locking differential, automatic engagement and disengagement
Model	ZF DZ

Total ratio and speeds

Gear	Position			Number of engine revolutions for one revolution of driving wheels	Nominal travelling speed at rated engine speed*	
No.					km/h	m/s
Forward	Gear	Group	Power-shift			
1	1	Low	low	256.09	2.9	0.80
2	1	L	high	199.01	3.8	1.06
3	2	L	l	170.47	4.4	1.22
4	2	L	h	132.48	5.7	1.58
5	3	L	l	113.97	6.6	1.83
6	4	L	l	93.86	8.0	2.22
7	3	L	h	88.57	8.5	2.36
8	1	High	l	79.82	9.4	2.61
9	4	L	h	72.94	10.3	2.86
10	1	H	h	62.03	12.1	3.36
11	2	H	l	53.13	14.2	3.94
12	2	H	h	41.29	18.2	5.05
13	3	H	l	35.52	21.2	5.88
14**	4	H	l	29.26	25.7	7.14
15	3	H	h	27.61	27.3	7.58
16**	4	H	h	22.73	33.1	9.19
Reverse						
1	R	L	l	208.54	3.6	1.00
2	R	L	h	162.09	4.6	1.28
3	R	H	l	65.01	11.6	3.22
4	R	H	h	50.52	14.9	4.14

* Tyre size: Rear 20.8 R 38. Radius index 868 mm (Dynamic)
** Blocked on markets with max. allowed speed 30 km/h

Number of revolutions of front wheels for one revolution on rear wheels
1.337 (Group gear in low position)
1.317 (Group in high position)

Power take-off

Make	Volvo BM
Location	At rear of tractor, 2 shafts
Type of drive	Independent and ground dependent p.t.o. selected by hand lever. Electrohydraulically operated dry multi disc clutch engaged and disengaged by switch
Dimensions	According to ISO 500

Proportional engine speed p.t.o.
Lower shaft
540 rev/min
6 splines/35 mm dia

Height above ground	631 mm
Distance from the median plane of the tractor	50 mm to the left
Distance behind rear axle	605 mm
P.t.o. speed at rated engine speed	601 rev/min
Engine speed at standard p.t.o. speed	2067 rev/min
Ratio	3.8281
Power restriction	48 kW
Direction of rotation (viewed facing driving end)	clockwise

Upper shaft 1000 rev/min 21 splines/35 mm dia	Height above ground	745 mm
	Distance from the median plane of the tractor	0 mm
	Distance behind rear axle	554 mm
	p.t.o. speed at rated engine speed	1127 rev/min
	Engine speed at standard p.t.o. speed	2042 rev/min
	Ratio	2.0417
	Direction of rotation (viewed facing driving end)	clockwise

Proportional ground speed p.t.o.
Travelling distance for one revolution of power take-off shaft:

540 rev/min shaft: 0.3271 m
1000 rev/min shaft: 0.1745 m

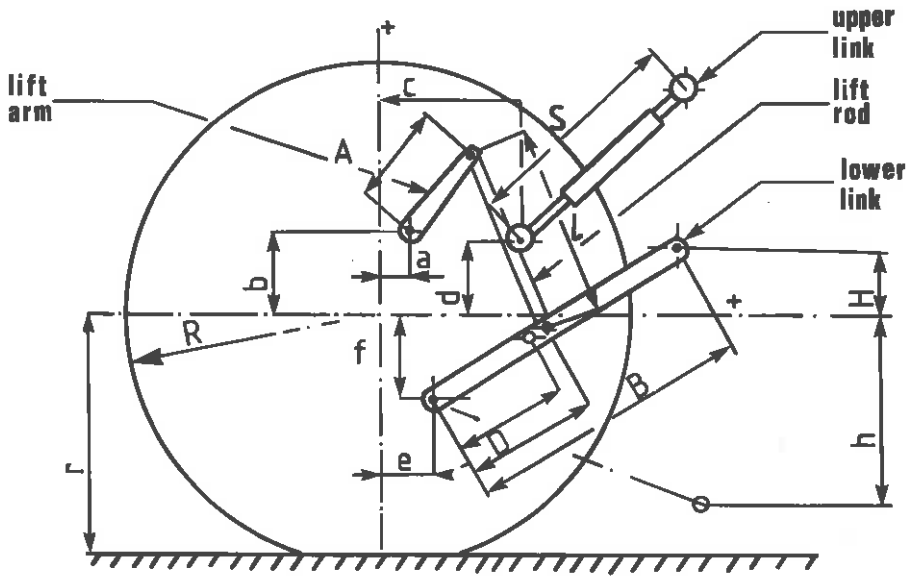
Number of power take-off shaft revolution for one revolution of rear wheels:

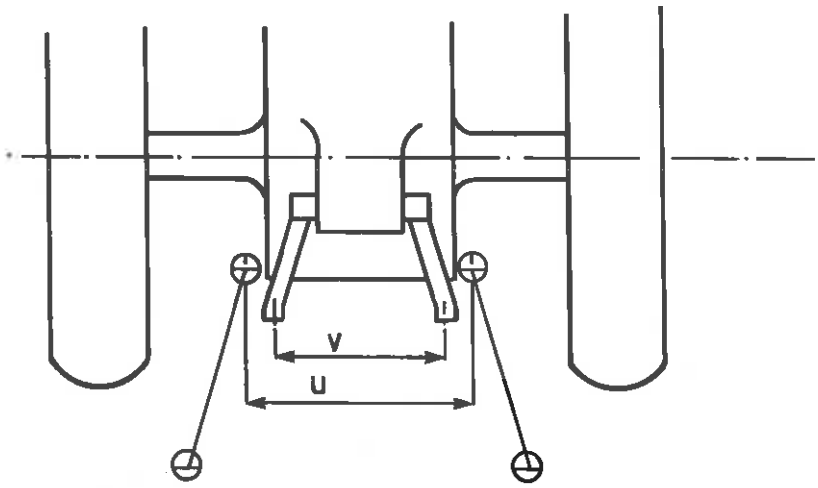
540 rev/min shaft: 16.672
1000 rev/min shaft: 31.261

Direction of rotation with forward gear engaged: clockwise

Power lift

Make/model	Volvo BM/Terra trol MII
Type	Three cylinders, single acting. Gear type pump driven from the engine by gear
Working pressure	17.0–17.8 MPa. Oil supplied from separate tank situated on the right hand-side
Safety valve	Not fitted
Filter	Full flow replaceable, paper element filter
Implement linkage	Category 2 according to ISO 730 with lower link sensing. Adaptor to category 3. Draught-, position- and mixed control 2 operating levers Hydraulic linkage lock for transport operated manually by separate valve
External tappings	2 double acting, and 1 single acting situated on top of rear axle housing. Oil capacity available for external use 43 dm^3
Recommended oil	See end of chapter "Specification"





Dimensions of linkage geometry, m. m

Dimensions of the implement linkage when connected to the standard frame (mm)

		Dimensions or range	Settings used in test
Rear tyres (size 20.8 R 38) loaded radius index	(R)	840	
Front tyres (size 16.9 R 28) loaded radius index	(r)	660	
Length of lift arms	(A)	277	
Lenght of lower links	(B)	895	
Distance of lift arm pivot point from rear wheel centre line			
horizontally	(a)	–262	
vertically	(b)	473	
Horizontal distance between the 2 lower link points	(u)	560	
Horizontal distance between the 2 lift arm end points	(v)	622	
Length of upper link	(S)	from 630 to 870	700
Distance of upper link pivot point from rear wheel centre line			
horizontally	(c)	410	
vertically	(d)	213, 293	213
Distance of lower link pivot point from rear wheel centre line			
horizontally	(e)	225	
vertically	(f)	243	
Distance of lower link pivot point to lift rod pivot points on lower links	(D)	443, 522	522
Length of lift rods	(l)	from 682 to 822	815
Height of lower hitch points relative to the rear wheel centre line, situated 840 mm above the ground level			
in low position	(h)	from 390 to 760	628
in high position	(H)	from 0 to 260	36
Height of lower hitch points when locked in transport position		from 840 to 1095 above ground	

Drawbar

Swinging drawbar. Height above ground 360 mm.
Vertical distance relative to p.t.o. 258 mm (540 rev/min) and 370 mm (1000 rev/min) below.
Horizontal distance from rear axle 954/1004 mm.
Horizontal distance relative to p.t.o. 349/399 mm.
(540 rev/min) and 400/450 mm (1000 rev/min) behind.
Lateral adjustment 280 mm from centre position.
Pivot position relative to rear wheel centre 304/354 mm behind.
Diameter drawbar pin hole: 33 mm.
Permissible vertical load 7.8/6.8 kN.

Hitch

Pick-up hitch	Height above ground 447 mm. Horizontal distance from rear axle 694 mm. Vertical distance relative to p.t.o. 180 mm (540 rev/min) and 292 mm (1000 rev/min) below Horizontal distance relative to p.t.o. 89 mm (540 rev/min) and 140 mm (1000 rev/min) behind. Diameter hitch pin hole: 50 mm Permissible vertical load: 30 kN

Steering

Make and model	Danfoss, Orbitrol OSPC 160 LS
Type	Hydrostatic power assisted with load sensing valve. Gear type pump integrated with hydraulic pump. Single cylinder acting on right and left steering arm. Adjustable steering columninclination. Working pressure 12.5 MPa. Oil capacity, changing period, filter changing period: see "conditions used in tests"
Recommended oil	See end of chapter "Specification".

Brakes

Service brake

Make	Brembo
Model	2328 N
Type	Rear wheel braked by dry caliper brake, disc diameter 350 mm, one disc mounted on each differential shaft. Organic lining material.
Method of operation	Hydraulically and servoassisted by vacuum, one pedal with hand operated selector valve with automatic return for steering brake.
Trailer braking take-off	Hydraulic operated by the service brake pedal.

Parking brake

Type	Dry caliper brake mounted to the same disc as the service brak organic lining material.
Method of operating	Mechanically operated by hand lever and with linkage separated from service brake.

Wheels

Steering and driving wheels	Two at front. Type: Pneumatic, radial tyres 16.9 R 28, load index 136A8. Maximum permissible load on each tyre 23.5 kN at 160 kPa pressure. Track width 1670, 1720, 1840, 1880, 1910, 1960, 2080, 2120 mm, changed by reversing wheel disc and rim.
Driving wheels	Two at rear. Type: Pneumatic, radial tyres 20.8 R 38, load index 153A8. Maximum permissible load on each tyre 38.3 kN at 160 kPa pressure. Track width 1820, 1920, 2020, 2120 mm, changed by reversing wheel disc and rim.
Wheelbase	2845 mm.

Seat

Make and model	Bostrom Viking 303.
Type	Torsion bar suspension, adjustable to driver's mass. Damping by hydraulic shock absorber. Range of adjustment 130 mm horizontally and 60 mm vertically.

Protective cab

OECD approval number	CSD 0194/4; CSS 034/2
Trade name	Volvo BM 2650 H
Manufacturer's name and address	Volvo BM AB, Hallsberg, Sweden

Lighting The lighting system is in accordance with the national Swedish regulations for road traffic.

	Height above ground of centre mm	Size mm	Distance from outside edge of tractor centre mm
Head lights	1365	145 × 90*	1040
Side lights	1890	65 × 65*	380
Rear lights	1750	100 × 90*	375
Reflectors lower	670	70	645
upper	1420	70	160

* Rectangular

Repairs during test None

Conditions during test

Overall dimensions

	Length, m	Width, m	Height, m	
			exhaust silenser	cab
With ballast	4.81	2.44	3.40	3.10
Without ballast	4.72	2.44	3.40	3.10

Masses

Tractor without driver but with tanks full

Without ballast	Part of mass on front wheels		2160 kg
	Part of mass on rear wheels		4175 kg
	Total mass		6335 kg
With ballast	Part of mass on front wheels		3000 kg
	Part of mass on rear wheels		5540 kg
	Total mass		8540 kg
Ballast	Front: Frame and front weights	total	385 kg
	Rear: Weights	total	640 kg
	Liquid front	total	360 kg
	Liquid rear	total	820 kg
Track setting	Front: 1840 mm		
	Rear: 1920 mm		

Fuel and lubricants used in tests

Fuel Diesel fuel to Swedish Standard SS 155432.
Density at 15°C 0.840 g/cm^3.
Viscosity at 20°C 3.2 mm^2/s (cSt).
Cetane number 49.

Oils – capacity and change intervals

	Capacity (dm^3)	Oilchange (h)	Filter-change (h)
Engine	15	200	200
Gearbox and rear axle	95	1600	–
Power shift with servosystem	15	800	800
Front axle and final drives	8+0,75×2	1600	–
Hydraulic system	74	800	400
Steering	in common with hydraulic system		

Specifications

Oils	**Recommended**	**Used during test**
Engine oil		
Type:	API CD	Agrol Turbo Kombi
Viscosity:	SAE 10W/30	7.0 mm^2/s (cSt) at 100°C
Transmission oils		
Type:	Transmission, hypoid oil	Transmission oil API GL 5
Viscosity:	SAE 90	SAE 90
Front axle		
Type:	Transmission, hypoid oil API GL 5	Transmission, hypoid oil API GL 5
Viscosity:	SAE 90	SAE 90
Power shift with servosystem		
Type	Transmission oil HTF C3	Transmission oil HTF C3
Viscosity:	SAE 10W/20	SAE 10W/20
Steering oil		
Type:	Hydraulic oil or engine oil API CD	Transmission oil HTF C3
Viscosity:	SAE 10W/30	SAE 10W/20
Hydraulic fluid		
Type:	Hydraulic oil or engine oil API CD	Transmission oil HTF C3
Viscosity:	SAE 10W/30	SAE 10W/30
Type of grease:	Universal	
Number of grease points:	24	

Compulsory tests

1. Main power take-off performance

Date and location of tests: 1986-09-09, Ultuna, Uppsala, Sweden
Type of dynamometer: Eddy current, make Zöllner

Power	Speed rev/min		Fuel consumption				Specific energy	
kW	Engine	p.t.o.	l/h	kg/h	g/MJ	kg/kWh	MJ/l	kWh/l
Maximum power								
At 2-hour test								
98.9	2300	1126	29.8	25.0	70.3	0.253	11.94	3.32
Varying loads. The governor hand lever in the position corresponding to maximum power at full load.								
(1) Maximum power								
99.1	2301	1127	29.7	25.0	69.9	0.252	12.02	3.34
(2) 85% of the load at max. power rated speed								
85.3	2330	1141	26.4	21.9	71.3	0.257	11.64	3.23
(3) 75% of the load defined in (2)								
65.1	2368	1160	21.6	17.9	76.6	0.275	10.84	3.01
(4) 50% of the load defined in (2)								
44.2	2414	1182	17.2	14.2	89.5	0.322	9.27	2.58
(5) 25% of the load defined in (2)								
22.3	2446	1198	12.5	10.4	129.1	0.465	6.43	1.79
(6) Unloaded								
1.9	2475	1212	8.5	7.0	– –	– –	– –	– –
Varying loads. The governor hand lever in the position corresponding to standard p.t.o. speed (1000 rev/min).								
(1) Maximum power								
95.8	2042	1000	27.4	22.8	66.0	0.237	12.58	3.50
(2) 85% of the load at max. power								
84.4	2125	1041	24.8	20.6	67.4	0.242	12.32	3.42
(3) 75% of the load defined in (2)								
65.0	2173	1064	20.1	16.7	71.5	0.257	11.61	3.22
(4) 50% of the load defined in (2)								
44.4	2228	1091	15.9	13.2	82.2	0.296	10.09	2.80
(5) 25% of the load defined in (2)								
22.5	2266	1110	11.3	9.4	115.6	0.416	7.18	2.00
(6) Unloaded								
1.6	2299	1126	7.2	6.0	– –	– –	– –	– –

Standard specific fuel consumption:	71.3 (0.257)/89.5 (0.322) g/MJ (kg/kWh) 67.4 (0.242)/82.2 (0.296) g/MJ (kg/kWh)
No load maximum engine speed	2475 rev/min
Torque at maximum power corresponding to 2 hour test	411 Nm
Torque corresponding to maximum power at varying loads	411 Nm
Maximum torque	495 Nm at 1497 rev/min engine speed
Mean atmospheric conditions	Temperature 19 °C Pressure 101.0 kPa Rel. humidity 35 %
Maximum temperatures	Coolant 92 °C Engine oil 103 °C Fuel 25 °C Engine air intake 33 °C

2. Power lift and hydraulic pump performance

Date of test: 1986-09-15

Type of linkage
lock for transport: Hydraulic

Power lift

Height above ground in down position mm	Vertical movement mm	Maximum force exerted through full range kN	Corresponding pressure of hydraulic fluid MPa	Moment about rear axle kNm	Tilt angle of mast from vertical position degrees
At the hitch points					
212	664	38.2	15.2	42.7	– –
On the frame					
202	681	37.8	15.2	65.4	3.5

Temperature of hydraulic fluid at start of test 56° C.

Lifting heights relative to the horizontal plane including the lower link pivot points

mm	–396	–385	–300	–200	–100	±0	+100	+200	+279	+285
Lifting forces at the hitch points										
kN	– –	38.2	41.8	44.1	45.4	46.3	46.3	47.2	47.2	– –
Lifting forces at the test frame										
kN	41.8	– –	43.6	42.7	41.8	40.9	40.4	38.7	– –	37.8

Hydraulic pump performance

Tapping point	Double acting external tapping
Opening pressure of the relief valve	15.2 MPa
Sustained pressure with relief valve open	16.9 MPa
Pump delivery rate at rated engine speed at minimum pressure	1.04 l/s (62.6 l/min)
Hydraulic power at	
90 per cent of relief valve setting	15.0 kW
corresponding delivery rate	0.98 l/s (59.0 l/min)
pressure	15.2 MPa
maximum hydraulic power	15.0 kW
corresponding delivery rate	0.98 l/s (59.0 l/min)
pressure	15.2 MPa
Temperature of hydraulic fluid	64–70°C

Table 1. Linkage geometry when connected to the standard frame

Projected length in side view		
Lower links	895 mm	
Lift arms	277 mm	
Lift rods	815 mm	
Upper link	700 mm	
Distance of lift rod connection point from pivot point of lower link	522 mm	
The following dimensions are given relative to the rear wheel centre line, situated 840 mm above the ground level		
Lower link pivot point	225 mm behind	243 mm below
Upper link pivot point	410 mm behind	213 mm above
Lift arm pivot point	262 mm behind	473 mm above
Maximum and minimum height of lower link hitch points	36 mm above	628 mm below
Height of lower link hitch points when locked in transport position	36 mm above	– –

3. Drawbar performance

Date of tests: 1986-09-24, 26, 30. 1986-10-01
Type of track: Tarmac
Height of drawbar above ground:

unballasted	385 mm
ballasted	380 mm

Tyre inflation pressure:

unballasted	rear	130 kPa, front 110 kPa
ballasted	rear	150 kPa, front 150 kPa

Results see Table 1.

Engine oil consumption during ten hours duration of test (iii) and (iv) was 170 g/h. Test (iv) was carried out with additional ballast, 2510 kg. Power, speed, slip and fuel consumption do not correspond to test (ii) gear 2 L.

Table 2. Drawbar performance

Gear	Power	Draw-bar pull	Speed		Engine speed		Wheel slip	Spec. fuel consumption		Spec. energy		Temperature			
												Coo-lant	Fuel	Engine oil	Transm. oil
	kW	kN	m/s	km/h	rev/s	rev/min	%	g/MJ	kg/kWh	MJ/l	kWh/l	°C	°C	°C	°C
(i) Maximum power (unballasted tractor)															
1Lh	53.0	57.3	0.92	3.33	39.4	2364	15.8	98.5	0.355	8.52	2.37	81	25	95	44
2Ll	62.2	58.0	1.07	3.86	39.0	2342	15.8	95.6	0.344	8.79	2.44	82	28	91	41
2Lh	78.7	57.0	1.38	4.97	38.3	2297	13.7	89.7	0.323	9.37	2.60	82	29	94	43
3Ll	84.3	49.0	1.72	6.19	38.3	2300	7.4	83.7	0.301	10.03	2.78	82	30	97	46
3Lh	85.9	38.0	2.26	8.14	38.3	2300	5.8	81.8	0.295	10.26	2.85	82	30	97	46
4L1	85.6	40.0	2.14	7.70	38.3	2300	5.6	82.4	0.297	10.19	2.83	82	31	97	50
4Lh	84.0	30.0	2.80	10.08	38.3	2300	3.4	83.7	0.301	10.04	2.79	82	30	96	49
1Hl	84.8	33.5	2.53	9.11	38.3	2300	3.7	82.9	0.298	10.13	2.81	82	33	98	52
1Hh	84.2	25.5	3.30	11.88	38.3	2300	2.7	83.5	0.301	10.06	2.79	82	33	97	52
(ii) Maximum power (ballasted tractor)															
1Ll	55.8	77.8	0.72	2.58	39.2	2355	15.3	98.6	0.355	8.52	2.36	81	31	95	48
1Lh	70.9	77.8	0.91	3.29	38.7	2322	15.3	91.7	0.330	9.16	2.54	82	31	96	48
2Ll	82.2	74.2	1.11	3.99	38.4	2302	11.0	85.1	0.306	9.88	2.74	82	29	95	47
2Lh	84.9	56.6	1.50	5.40	38.4	2303	6.5	82.1	0.296	10.23	2.84	82	29	96	45
3Ll	87.2	49.2	1.77	6.38	38.4	2302	4.4	80.0	0.288	10.50	2.92	82	29	94	44
3Lh	88.3	38.4	2.30	8.28	38.2	2295	3.6	79.6	0.286	10.56	2.93	81	26	93	46
4Ll	86.1	39.7	2.17	7.81	38.3	2300	3.9	81.6	0.294	10.29	2.86	82	19	97	40
4Lh	85.9	30.5	2.82	10.14	38.3	2300	2.7	81.8	0.294	10.27	2.85	82	23	96	43
1Hl	87.5	34.2	25.6	9.21	38.3	2300	2.9	80.3	0.289	10.46	2.90	81	24	95	42
1Hh	87.4	26.3	3.32	11.96	38.3	2300	2.1	80.4	0.290	10.44	2.90	81	24	95	42
2Hl	85.6	22.0	3.89	13.99	38.3	2300	2.0	82.2	0.296	10.22	2.84	82	26	88	36
(iii) Five hour test at 75% pull at maximum power															
3Lh	68.0	28.8	2.36	8.50	38.9	2333	2.5	86.8	0.313	9.67	2.69	81	42	100	64
(iv) Five hour test corresponding to 15% wheelslip															
1Lh	76.3	77.8	0.98	3.53	38.5	2310	7.8	– –	– –	– –	– –	86	– –	103	71

Atmospheric conditions

	Temperature °C	Relative humidity %	Pressure kPa
Maximum power			
unballasted tractor	8–10	60	101.4
ballasted tractor	6–11	46	101.8
Five hour tests			
at 75% pull at max. power	10–17	48	100.7
at max. pull	14–25	55	101.3

4. Turning space and turning circle

Details of wheel equipment: As in specification without ballast

	With brakes*		Without brakes*	
	Left-hand m	Right-hand m	Left-hand m	Right-hand m
Radius of turning space	– –(4.76)	– –(4.75)	6.20 (5.64)	6.23 (5.62)
Radius of turning circle	– –(4.38)	– –(4.37)	5.82 (5.26)	5.85 (5.24)

* Figures in brackets indicate front wheel drive disengaged

5. Location of centre of gravity

Height above ground	1090 mm
Distance forward from the vertical plane containing the axis at rear wheels	973 mm
Distance from the median plane	2 mm (to the left)

6. Braking

Date of tests: 1986-09-18/1986-10-20, 23
Tractor masses during brake tests:

Front kg	Rear kg	Total kg
3500	7500	11000 (ballasted)
2190	4215	6405 (unballasted)

Type 0, ordinary cold service braking device performance test

Speed before application of brakes:

ballasted tractor	unballasted tractor
28.5 km/h	28.8 km/h

Ballasted	Braking device control force	N	450*	250	190	140	95
	Mean deceleration	m/s^2	3.74	3.00	2.50	2.00	1.50
Unballasted	Braking device control force	N	150*	120	100	80	55
	Mean deceleration	m/s^2	3.48	3.00	2.50	2.00	1.50

* not locked

Type I, (fade) test ballasted tractor

Braking device control force	N	300*	215	160	120	75
Mean deceleration	m/s^2	3.60	3.00	2.50	2.00	1.50

* not locked

The brakes were heated by self propelled tractor.
Comments on deviation and vibration: None

Parking brake device test

		18 per cent slope		12 per cent slope with trailer of 3000 kg	
		Up	Down	Up	Down
Braking device control force	N	410	410	206	250

7. Measurement of external noise level

Date of test: 1986-09-22
Type of sound level meter: Brüel & Kjær 2204
Type of track: Tarmac

Result of tests:

Gear: 3Hh
Travelling speed before acceleration: 21.6 km/h
Sound level: 87.5 dB(A)

8. Noise measurement at the driver's ear

Date of test: 1986-09-24
Type of sound level meter: Brüel & Kjær 2204
Type of track: Tarmac
Cab fitted: Yes

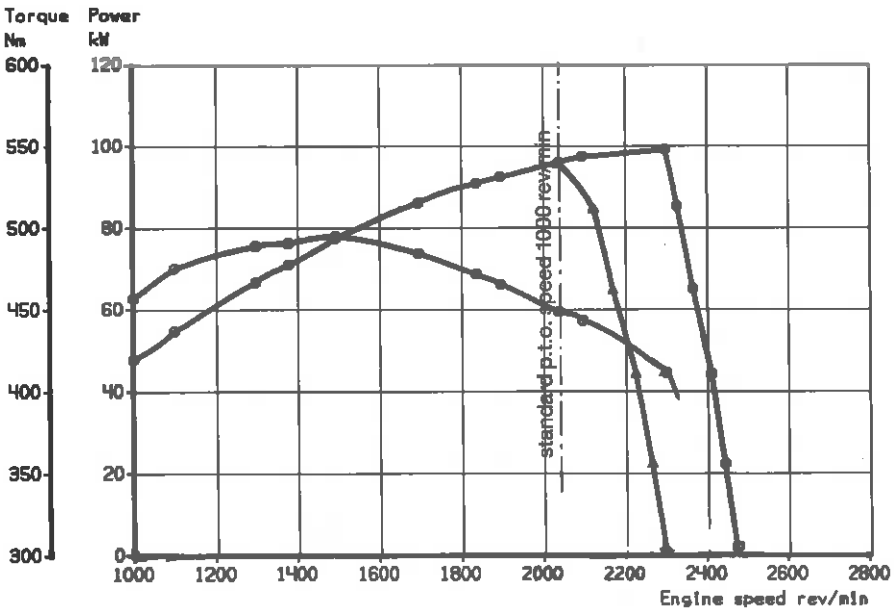
Result of tests

Gear	Drawbar pull at which the tractor develops the maximum sound level kN	Measured travelling speed km/h	Sound level dB(A)
4Ll*	40.0	7.7	80.5
1Lh	57.3	3.3	81.5
2Lh	48.5	5.4	82
1Hh	25.8	11.9	83
2Hl	21.5	14.0	81.5
2Hh	14.5	18.2	83
3Hl	13.0	21.0	82
4Ll*	light load	8.7	78.5
3Hh	light load	29.2	79.5

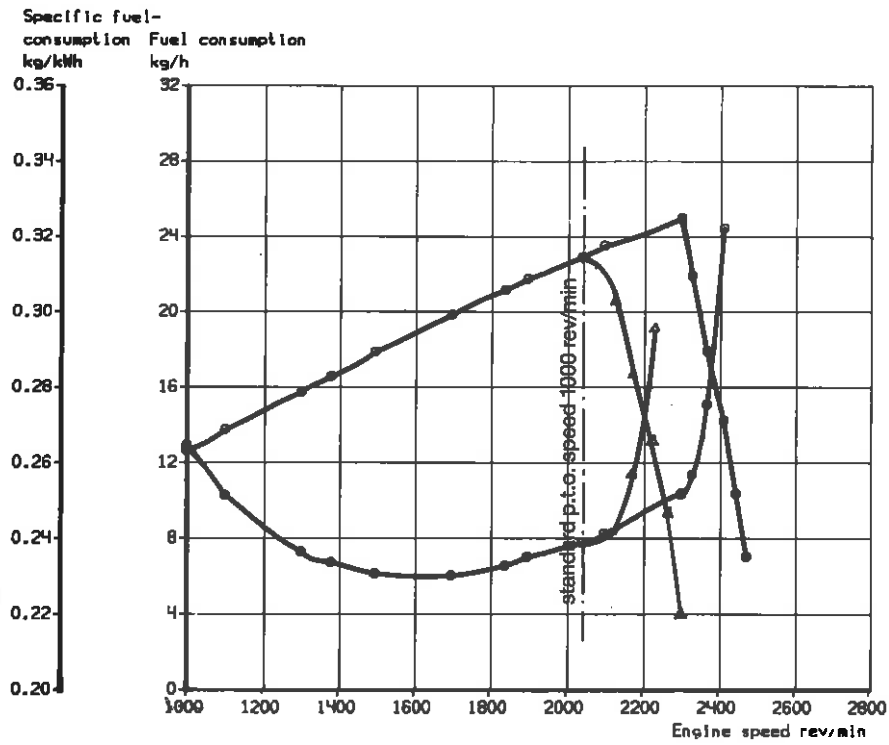
* Gear corresponding to the nominal travelling speed nearest to 7.5 km/h.

Ultuna, Uppsala 1986-12-04
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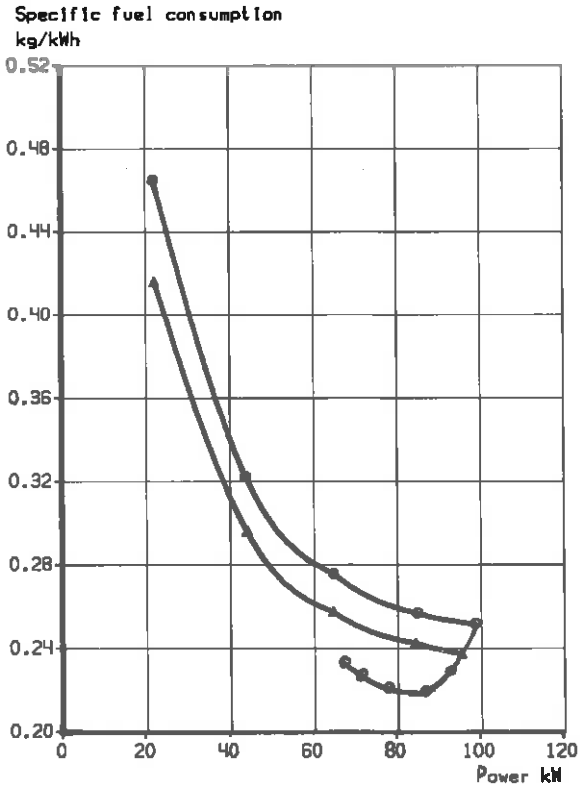
National Machinery Testing Institute	**Power take-off test Valmet 2005 (4 WD)**	Figure 1



National Machinery Testing Institute	**Power take-off test Valmet 2005 (4 WD)**	Figure 2



National Machinery Testing Institute	**Power take-off test Valmet 2005 (4 WD)**	Figure 3



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