STATENS MASKIN-PROVNINGAR

NATIONAL MACHINERY TESTING INSTITUTE

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TEST BULLETIN: OECD No.1363 (Restricted code)

Date of approval 1992-03-27

Report on test in accordance with the O.E.C.D Standard code II for the Official Testing of Agricultural Tractor Performance

AGRICULTURAL TRACTOR VALMET 8400 (4WD)

Manufactured by: Valmet Tractors Inc., Jyväskylä, Finland and Massey Ferguson SA, Beauvais, France

Agricultural tractor Valmet 8400 (4wd)



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

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[1] All specified dimensions refer to the tyre size 16/9R28 at front, 20/8R38 at rear and the track width 1910 mm at front and 1915 mm at rear.

Tractor manufacturer:	Manufactured for Valmet Tractors Inc. by Massey Ferguson SA
Location of tractor assembly:	Beauvais, France
Submitted for test by:	Valmet Maskin AB, Box 1102 631 80 Eskilstuna, Sweden
Selected for test by:	The manufacturer in agreement with the testing station
Place of running-in:	Jyväskylä, Finland
Duration of running-in:	30 h
Location of test:	National Machinery Testing Institute, Uppsala, Sweden

Specification of tractor

Tractor	
Make:	Valmet
Trade name:	Valmet
Model:	8400
Type:	Four-wheel drive unit construction
Serial No.:	P 321027
1st Serial No.:	P 321027
Engine	
Make	Valmet
Model:	620 DS
Type:	Turbocharged, 4-stroke water cooled, direct injection, diesel engine
Serial No.:	97740
Cylinder No.:	6
Disposition:	Vertical in-line
Bore/stroke:	108/120 mm
Capacity:	6600 cm^3
Compression ratio:	16.5:1
Arrangement of valves:	Overhead
Cylinder liners:	Wet, replacable
Supercharging	
Make:	Schwitzer
Model:	S2B
Type:	Exhaust turbo-supercharger
Pressure:	0.14 MPa(max)
Fuel system	
Fuel feed system:	Bosch FP/KE mechanical piston type pump
Make, model and type of fuel filters:	CAV, dual element with sediment bowls
Capacity of fuel tank:	250 dm^3
Make, model and type of injection pump:	Bosch, PES 6A, in-line type
Serial No.:	6126139
Manufacturer's production setting of injection pump:	75 ± 3 mm^3 per stroke at 1100 rev/min of the pump at full injection rate (rated engine speed and full load)
Timing:	21° before T.D.C.
Make, model and type of injectors:	NB 770620 Stanadyne NBS 770671, multihole
Injection pressure:	23 MPa

Governor

Make:	Bosch
Model:	RSV
Type:	Mechanical, incorporated in fuel injection pump
Governed range of engine speed:	From 750 to 2400 rev/min
Rated engine speed:	2200 rev/min

Air cleaner

Pre-cleaner

Make:	Donaldson
Type:	Built-in centrifugal, self-cleaning by exhaust extraction of dust particles

Main cleaner

Make:	Donaldson
Type:	Dry paper air cleaner including replaceable paper element and replaceable safety element
Maintenance indicator:	Electric (warning lamp)
Location of air intake:	In front of radiator

Exhaust system

Make:	Massey Ferguson/Luchaire
Type:	Muffler, expansion chamber type
Location:	Horizontal on right-hand side, vertical debouch 2,89 m above ground (maximum height of the tractor is 3,01 m)

Lubrication system

Type of feed pump:	Gear type pump
Type of filter:	Strainer on suction side and external canister type filter
Number:	1

Cooling system

Type of coolant:	Water
Type of pump:	Centrifugal pump, impeller assisted
Specification of fan:	Viscostatic, belt driven
- number of fan blades:	9
- fan diameter:	560 mm
Coolant capacity:	34 l
Temperature control:	Thermostat and viscostatic coupling for fandrive
Superpressure system:	50 kPa

Starting system

Make:	Lucas
Model:	M127
Type:	Electrical, solenoid starting motor
Power:	2.8 kW
Cold starting aid:	CAV thermostart
Safety device:	Starter interlock with clutch pedal

Electrical system

Voltage:	12 V
Generator	
Make:	Valeo
Type:	Alternator, 70 A
Power:	0.84 kW
Batteries	
Number:	2
Rating:	250 Ah at 20 hours (2 × 125)

Transmission to wheels

Clutch (travel alone)

Make:	Valeo
Type:	Dry dual disc with damper
Number of plates:	2
Diameter of plates:	310 mm
Method of operation:	Foot pedal, hydraulically disengaged

Gear box

Make:	Massey Ferguson
Type:	Mechanical, constant mesh
Arrangement:	Basic gearbox with 4 syncronized speed gears and 2 range gears (h and l) giving 8 basic speeds. Quick-shift gear and reverse shuttle
Number of gears:	16 forward and 16 reverse
Available options:	Crawler gear, 40 km/h transmission

Rear axle and final drive

Make:	Massey Ferguson
Type:	Crown wheel and pinion and inboard epicyclic reduction
Differential lock:	
Type:	Mechanical, dog clutch
Method of engagement:	Hydraulic, with electrical control
Method of disengagement:	When brake pedal is depressed (spring return)

Front axle and final drive

Make:	Massey Ferguson/GKN
Type:	Mechanical, driven from bottom of gearbox and two gears and a universal joint shaft. Axle with crown wheel and pinion and planetary final drives in wheel hubs
Differential lock:	
type:	Mechanical, dog clutch
method of engagement:	Hydraulic with electrical control
method of disengagement:	Spring return

Total ratios and travelling speeds

Position			Number of engine revolutions for one revolution of the driving wheels		Nominal travelling speed[1] at rated engine speed of 2200 rev/min, km/h	
Gear	Group	Quick-shift	Forward	Reverse	Forward	Reverse
1	Low	low	304.317	253.598	2.33	2.80
1	L	high	240.784	200.653	2.94	3.53
2	L	l	193.545	161.288	3.66	4.40
2	L	h	153.138	127.615	4.63	5.56
3	L	l	141.796	118.163	5.00	6.00
3	L	h	112.193	93.494	6.32	7.58
4	L	l	102.083	85.069	6.95	8.34
4	L	h	80.770	67.308	8.78	10.54
1	High	l	87.901	73.251	8.07	9.68
1	H	h	69.549	57.958	10.20	12.24
2	H	l	55.905	46.588	12.68	15.22
2	H	h	44.233	36.861	16.03	19.24
3	H	l	40.957	34.131	17.31	20.78
3	H	h	32.406	27.005	21.88	26.26
4	H	l	29.486	24.572	24.05	28.86
4	H	h	23.330	19.442	30.40	36.47

[1] Calculated with a tyre dynamic radius index of 855 mm ISO 4251/1-1984).

Number of revolutions of front wheels for one revolution of rear- wheels: 1.342

Power take-off

Main power take-off

Type:	Independent
Method of engagement:	Wet, hydraulically operated, multi disc cluch
Number of shafts:	1
Method of changing power take-off shaft ends and speeds:	By changing shaft

Power take-off proportional to engine speed

540 rev/min	6 splines in conformity with ISO 500/1991
Location:	Rear end of rear axle housing
Diameter of power take-off shaft end:	35 mm
Height above ground:	780 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear-wheel axis:	550 mm
PTO speed at rated engine speed (2200 rev/min):	597 rev/min
Engine speed at standard power take-off speed:	1992 rev/min
Ratio of rotation speeds:	3.688

Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise
1000 rev/min	21 splines in conformity with ISO 500/1991
Location:	Rear end of rear axle housing
Diameter of power take-off s haft end:	35 mm
Height above ground:	780 mm
Distance from the median plane of the tractor:	0 mm
Distance behind rear-wheel axis:	499 mm
PTO speed at rated engine speed (2200 rev/min):	1053 rev/min
Engine speed at standard power take-off speed:	2090 rev/min
Ratio of rotation speeds:	2.090
Direction of rotation (viewed from behind tractor):	Clockwise
Power take-off proportional to ground speed:	None

Power lift

Make:	Massey Ferguson/Valmet
Model:	Autocontrol II
Type:	Electrohydraulically controlled hydraulic power lift in unit construction, draft and position control both mixable by steps. Lower link sensing
Type of hydraulic system:	Open center
Type and number of cylinders:	Two external single-acting cylinders
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	18.5 MPa (Tolerance +1.5, -1.0 MPa)
Opening pressure of cylinder safety valve:	20.0 MPa (Tolerance +1.0 MPa)
Lift pump type:	Double gear type pump
Transmission between pump and engine:	Independent pump drive from P.T.O. intermediate shaft
Type and number of filters:	One full flow replacable filter
Site of oil reservoir:	In the gearbox
Type, number and location of tapping points:	3 double-acting situated on top of rear axle housing. Two can be switched to single-acting
Maximum volume of oil available to external cylinders:	34 l

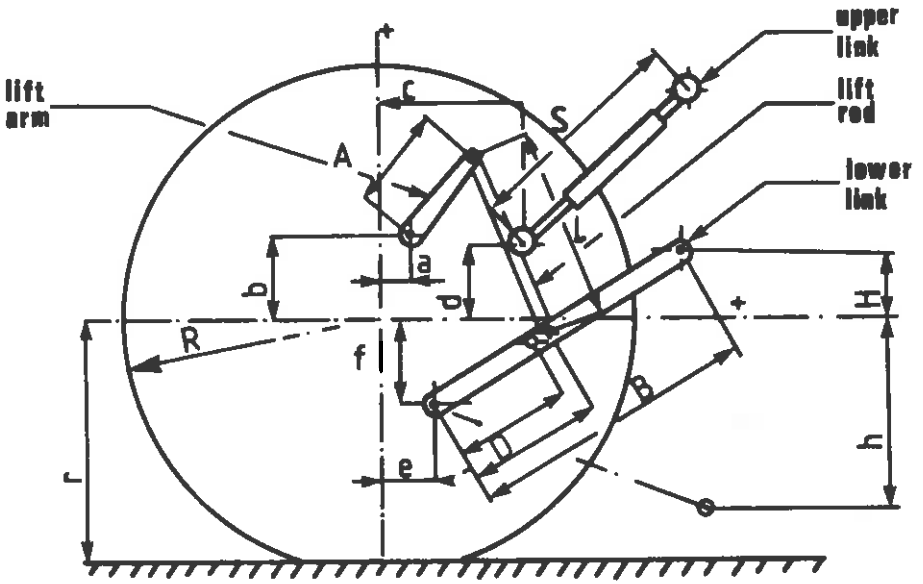


Figure 1. Lift test - Linkage geometry.

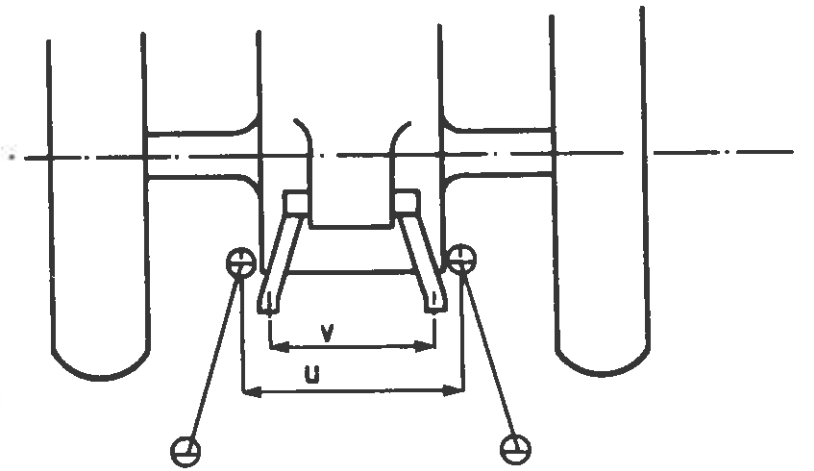


Figure 2. Lift test - Linkage geometry.

Three-point linkage

Category 3, in conformity with
categories 2 and 3 of ISO 730/1-1990 (Quick couplers at lower links and upper link)
Category adapter: Category 2 by changing joint balls

Linkage geometry when connected to the standard frame

		Dimension or range mm	Settings used in test mm
Rear tyres: dynamic radius index	(R)	855	
Front tyres: dynamic radius index	(r)	670	
Length of lift arms	(A)	362	
Length of lower links	(B)	975	
Distance of lift arm pivot point from rear-wheel axis: -horizontally	(a)	185	
-vertically	(b)	432	
Horizontal distance between the 2 lower link points	(u)	513	
Horizontal distance between the 2 lift arm endpoints	(v)	606	
Length of upper link	(S)	from 670 to 800	793
Distance of upper link pivot point from rear wheel axis: -horizontally	(c)	428	
-vertically	(d)	121/179/238	238
Distance of lower link pivot point from rear wheel axis: -horizontally	(e)	224	
-vertically	(f)	300	
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	525	
Length of lift rods	(L)	from 677 to 855	815
Height of lower hitch points relative to the rear-wheel axis:			
-in low position	(h)	from 325 to 722	618
-in high position	(H)	from 0 to 328	71
Height above ground of lower hitch points when locked in transport position[1]		from 133 to 1183	

[1] With a tyre dynamic index of 855 mm (ISO 4251/1 - 1984)

Swinging drawbar

Type:	The towing hook is convertable into an agricultural drawbar by reversing the hook, which has a clevis at its other end
Height above ground:	520 mm
Type of adjustment:	None
Distance of hitch point from rear-wheel axis, -horizontally:	897 mm

Distance of hitch point from power take-off end,	
-vertically:	270 mm
-horizontally (540 rev/min):	347 mm
-horizontally (1000 rev/min):	397 mm
Lateral adjustment:	306 mm from centre position
Distance of pivot point from rear-wheel axis, -horizontally:	227 mm behind
Diameter drawbar pin hole:	30 mm
Maximum permissible vertical load:	20 kN

Trailer hitch (in conformity with ISO 6489-1, 1991)

Type:	Pick-up hitch
Hole diameter:	50 mm
Height above ground:	497 mm
Distance of hitch point from rear-wheel axis, -horizontally:	680 mm
Distance of hitch point from power take-off shaft end:	
-vertically	283 mm
-horizontally (540 rev/min)	130 mm
(1000 rev/min)	180 mm
Maximum permissible vertical load:	30 kN

Steering

Make:	Danfoss
Model:	Orbitrol OSPC LS 200
Type:	Hydrostatic power assisted. Gear type pump integrated with hydraulic pump. One double acting central steering cylinder
Working pressure:	16 MPa

Brakes

Service brake

Make:	Massey Ferguson/Girling
Type:	One oil-immersed single disc per wheel
Method of operation:	Hydraulically from two master cylinders, servo assisted on option
Trailer braking take-off:	Hydraulic

Parking brake

Type:	Oil-immersed multi disc on the rear axle pinion
Method of operation:	Hand operated, mechanically connected

Wheels

Number	
- Front (driving and steering):	2
- Rear: (driving):	2
Wheelbase:	2925 mm

Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	1686	2174	Reversing wheel disc and rim
Rear	1620	2324	

Cab

Make:	Massey Ferguson
Model:	3000 D
Type:	Cab, not tiltable
Manufacturer's name and address:	Massey Ferguson SA Beauvais, France

Driver's seat

	Standard	On option
Make:	Grammer	Grammer
Model:	DS 85 H/90 A	LS 95 H/90AR
Type of suspension:	Mechanical, parallelogram	Air, parallelogram
Type of damping:	Hydraulic shock absorber	Hydr. shock absorber
Range of adjustment		
- longitudinal:	195 mm	210 mm
- vertical:	60 mm	60 mm

Miscellaneous

Additional seat:	Yes
Location:	To the left of the driver
Number of places:	1

Lighting

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	1280	165 x 105	260
Sidelights	1900	115 x 35	800
Rearlights	1830	50 x 70	835
Reflectors	1830	50 x 45	880
	1560	30 x 140	820
	760	55 x 100	680

Conditions during tests

Overall dimensions

	Length	Width		Height at top of	
		minimum	maximum	cab	exhaust silencer
	mm	mm	mm	mm	mm
Unballasted	5050	2370	2370	2960	3010

Ground clearance (unballasted tractor): 410 mm
Clearance-limiting part: Underside of drawbar frame

Tractor mass (with cab and tanks full):

	Unballasted	
	Without driver kg	With driver driver kg
Front	2220	2250
Rear	3670	3730
Total	5890	5980

Tyre specifications

	Front	Rear
Dimensions	16.9R28	20.8R38
Load index	136A8	153A8
Type	radial	radial
Maximum load (tyre manufacturer's)	23.5 kN	38.3 kN
Maximum load (tractor manufacturer's)	21.3 kN	34.1 kN
Inflation pressure (tyre manufacturer's)	160 kPa	160 kPa
Dynamic radius index	670 mm	855 mm
Chosen track width:	1910 mm	1915mm

Oils and lubrication, capacity and change interval

	Capacity dm^3	Oil change h	Filter change h
Engine	21	200	200
Transmission (gearbox, hydraulic system, rear axle and steering)	75	800	400
Front axle	11	800	
Final drive (front)	3.6	800	
Final drive (rear)	10	800	

Specifications

	Recommended	Used during test
Engine oil		
Type:		BP, Super TOU
Viscosity:	SAE 10W-30	SAE 10W-30
Classification:	API CD	MIL L 2104-C
Transmission oils		
Type:		BP, Super TOU
Viscosity:	SAE 20W-30	SAE 10W-30
Classification:	GL-4, STOU	MIL L 2104-C
Front axle and final drives		
Type:		BP, HYPO gear oil
Viscosity	SAE 80W-90	SAE 80W-90
Classification	GL-5	EP

Grease - number of lubrication points: 9

Fuel

Type:	Diesel fuel, in conformity with national standard
Density at 15° C:	0.82 g/cm^3

Compulsory tests

1. Main power take-off

Date and location of tests: 1991-10-09 Ultuna, Uppsala, Sweden
Type of dynamometer: Eddy current, make Zöllner

Power	Speed		Fuel consumption			Specific energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min	rev/min	kg/h	l/h	g/kWh	kWh/l
1.1 Maximum power - 2-hour test						
97.4	2166	1036	23.41	28.55	240	3.41
1.2 Power at rated engine speed						
95.6	2197	1051	23.06	28.12	241	3.40
1.3 Standard power take-off speed (1000 rev/min)						
97.4	2088	999	22.90	27.93	235	3.49
1.4 Varying loads. The governor hand lever in the position corresponding to maximum power at rated engine speed						
(1) Maximum power						
95.6	2197	1051	23.06	28.12	241	3.40
(2) 85 % of torque obtained in (1)						
82.2	2220	1062	20.46	24.95	249	3.30
(3) 75 % of torque defined in (2)						
62.5	2253	1078	16.97	20.70	272	3.02
(4) 50 % of torque defined in (2)						
42.2	2283	1092	13.23	16.13	313	2.62
(5) 25 % of torque defined in (2)						
21.4	2317	1108	9.62	11.73	449	1.82
(6) unloaded						
1.3	2349	1124	6.18	7.54	-	-

Power	Speed		Fuel consumption			Specific energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min	rev/min	kg/h	l/h	g/kWh	kWh/l
1.5 Varying loads. The governor hand lever in the position corresponding to standard P.T.O. speed (1000 rev/min)						
(1) Maximum power						
97.4	2085	999	22.90	27.93	235	3.49
(2) 85 % of torque obtained in (1)						
84.4	2131	1020	20.34	24.80	241	3.40
(3) 75 % of torque defined in (2)						
64.3	2165	1036	16.73	20.40	260	3.15
(4) 50 % of torque defined in (2)						
43.4	2195	1050	12.96	15.80	299	2.75
(5) 25 % of torque defined in (2)						
22.1	2231	1067	9.20	11.22	417	1.97
(6) unloaded						
1.0	2266	1084	5.69	6.94	-	-

No load maximum engine speed:		2349	rev/min
Torque (equivalent crankshaft)	at maximum power:	430	Nm
	at rated engine speed:	416	Nm
Maximum torque (equivalent crankshaft): (engine speed: 1377 rev/min)		562	Nm
Mean atmospheric conditions:	temperature:	18	°C
	pressure:	102.5	kPa
	relative humidity:	40	%
Maximum temperatures:	coolant:	86	°C
	engine oil:	110	°C
	fuel:	35	°C
	engine air intake:	21	°C

2. Hydraulic power and lifting force

Date of tests: 1991-10-29 (Power test)
1991-11-22 (Lifting force test)

2.1 Hydraulic power test

Sustained pressure with relief valve open:	18.08	MPa
Pump delivery rate at minimum pressure:	56.9	l/min
Tapping point used for test:	auxillary service connection	
Temperature of hydraulic fluid:	60-69	°C

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 % of actuale relief valve pressure setting and corresponding hydraulic power	47.6	16.3	13.2
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	50.8	16.1	13.7

2.2 Power lift test

	at the hitch point	on the frame
Height of lower hitch points above ground in down position	235 mm	237 mm
Vertical movement	688 mm	819 mm
Maximum corrected force exerted through full range	45.9 kN	42.1 kN
Corresponding pressure of hydraulic fluid	16.3 MPa	16.3 MPa
Moment about rear-wheel axis	54.6 kNm	75.4 kNm
Maximum tilt angle of mast from vertical		8.5 degrees

2.2 Power lift test (continued)

Lifting heights relative to the horizontal plane including the lower link pivot points mm												
-358	-320	-284	-250	-200	-100	0	+100	+200	+300	+368	+400	+461
Lifting forces kN[1], corresponding pressure: 16.3 MPa												
At the hitch points												
-	45.9	-	49.0	50.6	52.8	54.5	56.4	57.3	58.0	58.0	-	-
At the frame												
42.1	-	42.5	-	45.0	45.9	45.8	46.4	45.9	45.2	-	44.3	42.8

[1] The values measured are corrected to correspond to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting

3. Drawbar performance

Date of tests: 1991-11-05

Type of track: Tarmac

Height of drawbar above ground, 520 mm

Tyre inflation pressure - front: 160 kPa
- rear: 160 kPa

3. Drawbar performance (continued)

Gear and range	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption	Specific energy
	kW	kN	km/h	rev/min	%	g/kWh	kWh/l
3.1 Maximum power in tested gears (unballasted tractor)							
3 Lh	68.2	45.0	5.45	2228	16.3	314	2.61
4 Ll	74.8	45.0	5.98	2208	15.5	312	2.63
1 Hl	86.2	41.3	7.51	2183	8.0	286	2.87
4 Lh	84.0	36.7	8.24	2182	7.0	288	2.85
1 Hh	86.8	32.0	9.77	2170	4.7	280	2.93
2 Hl	86.8	25.2	12.44	2180	3.3	279	2.94
2 Hh	87.5	20.4	15.44	2180	3.4	279	2.94
3 Hl	86.8	18.8	16.63	2180	3.7	279	2.94
3 Hh	81.4	13.8	21.23	2180	2.3	296	2.77
3.2 Fuel consumption							
3.2.1	In selected gear nearest to 7.5 km/h at rated speed						
1 Hl	86.0	41.0	7.55	2195	7.3	281	2.92
3.2.1.1	75 % of pull at maximum power at rated speed						
1 Hl	68.4	30.8	8.00	2235	4.2	295	2.78
3.2.1.2	50 % of pull at maxumum power at rated speed						
1 Hl	46.9	20.5	8.24	2268	2.8	341	2.40
3.2.1.3	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.1.1						
4 Lh	68.0	30.7	7.98	2050	4.2	279	2.94
3.2.1.4	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.1.2						
4 Lh	47.3	20.5	8.31	2096	2.4	321	2.55
3.2.1.5	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.1.1						
1 Hh	68.1	30.7	7.98	1766	4.3	266	3.08
3.2.1.6	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.1.2						
1 Hh	46.7	20.5	8.20	1782	2.6	278	2.95
3.2.1.7	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.1.1						
2 Hl	69.4	30.7	8.13	1437	3.8	257	3.19
3.2.1.8	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.1.2						
2 Hl	47.0	20.5	8.25	1447	3.1	268	3.06
3.2.2	In selected gear, at rated speed[1]						
1 Hh	86.6	31.5	9.90	2195	4.6	279	2.94
3.2.2.1	75 % of pull at maximum power at rated speed						
1 Hh	67.4	23.6	10.28	2249	3.3	299	2.74
3.2.2.2	50 % of pull at maximum power at rated speed						
1 Hh	46.4	15.8	10.57	2280	2.0	347	2.36
3.2.2.3	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.2.1						
2 Hl	67.9	23.8	10.27	1805	3.3	268	3.06
3.2.2.4	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.2.2						
2 Hl	46.5	15.9	10.53	1832	2.3	308	2.66
3.2.2.5	Next higher gear at reduced engine speed, same pull and travelling speed as in 3.2.2.1						
2 Hh	66.0	23.0	10.33	1433	1.7	261	3.14
3.2.2.6	Next higher gear at reduced engine speed, same pull and travelling speed as in 3 .2.2.2						
2 Hh	46.8	15.9	10.60	1459	1.0	275	2.98

3. Drawbar performance (continued)

Gear and range	Temperature			Atmospheric conditions		
	Fule	Coolant	Engine oil	Tempera-ture	Relative humidity	Pressure
	°C	°C	°C	°C	%	kPa
3 Lh	34	82	104	7	97	99.1
4 Ll	34	82	105	7	"	"
1 Hl	27	81	95	6	"	"
4 Lh	37	83	108	7	"	"
1 Hh	36	81	102	7	"	"
2 Hl	36	81	102	7	"	"
2 Hh	28	81	91	7	"	"
3 Hl	36	81	101	6	"	"
3 Hh	38	82	106	7	"	"
1 Hl	35	80	100	5	"	"
1 Hl	37	81	104	6	"	"
1 Hl	38	80	105	5	"	"
4 Lh	37	82	103	6	"	"
4 Lh	37	80	102	6	"	"
1 Hh	35	79	100	6	"	"
1 Hh	37	79	101	6	"	"
2 Hl	35	80	99	6	"	"
2 Hl	36	79	99	6	"	"
1 Hh	37	82	100	6	"	"
1 Hh	39	84	104	6	"	"
1 Hh	39	81	105	6	"	"
2 Hl	39	79	102	6	"	"
2 Hl	39	80	102	6	"	"
2 Hl	38	81	102	6	"	"
2 Hl	39	80	102	6	"	"

4. Noise measurement at the driver's ear (optional test)

Date of test: 1991-11-05
Make and model of sound level meter: Bruel&Kjaer 2209
Type of track: Tarmac

Gear number	Drawbar pull kN		Measured travelling speed, km/h		Sound level dB(A)	
1 Hl[1]	40.9	0[2]	7.51	8.80[2]	75.5	74[2]
2 Lh	45.0		4.03		77	
3 Lh	38.0		5.72		76.5	
4 Ll	45.0		5.98		76.5	
4 Lh	31.2		8.54		77	
1 Hh	27.0		10.08		78	
2 Hl	21.4		12.57		77	
2 Hh	20.4		15.44		81	
4 Hh	8.8	0[2]	29.89	31.80[2]	78	74.5[2]

[1]Gear corresponding to the nominal travelling speed nearest to 7.5 km/h
[2]Light load

Repairs: P.t.o. multiplate clutch

Remarks: Disturbances in the electronic transmission control system

Ultuna, Uppsala, 1992-03-09
NATIONAL MACHINERY TESTING INSTITUTE

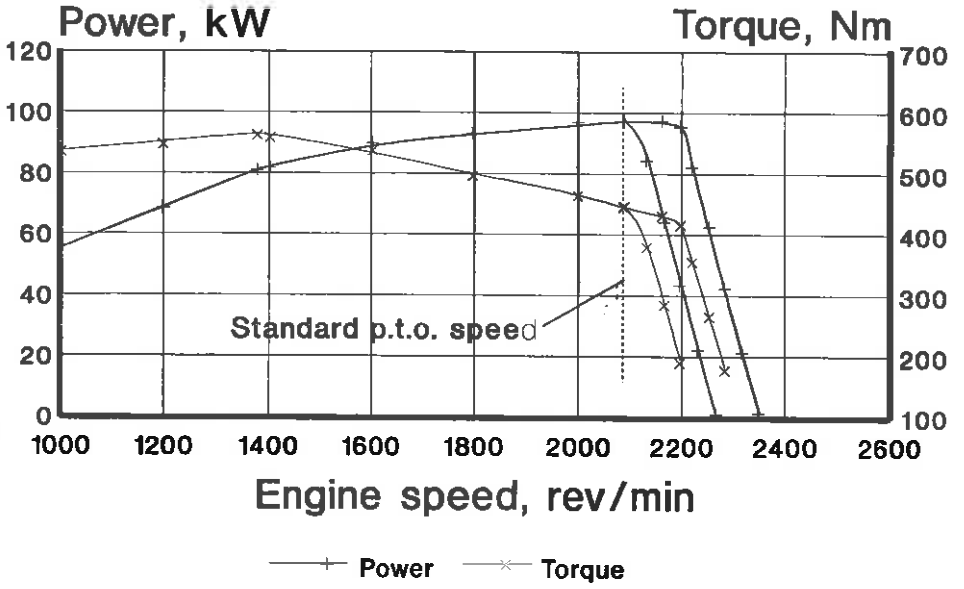


Figure 3. Power take-off test.

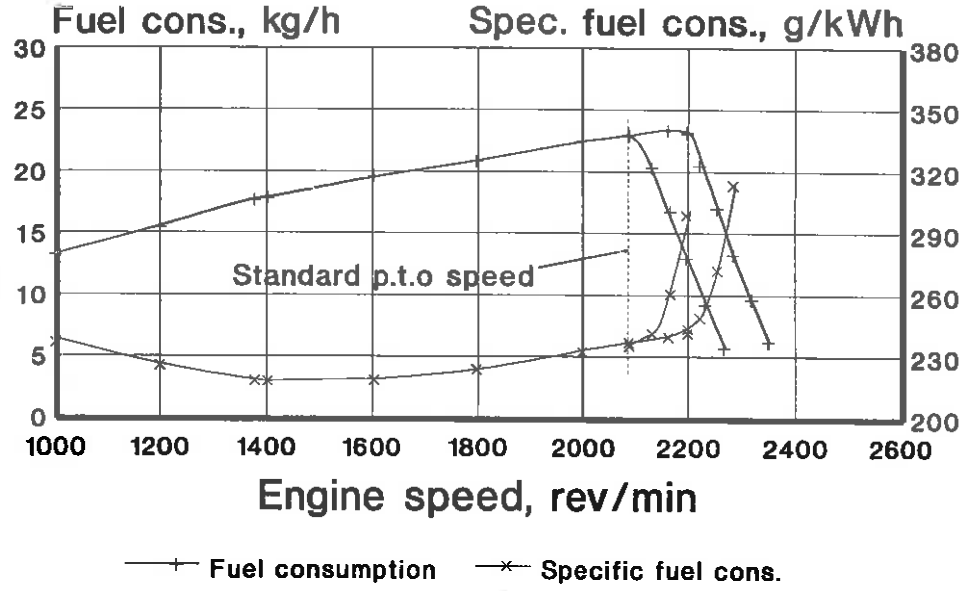


Figure 4. Power take-off test.

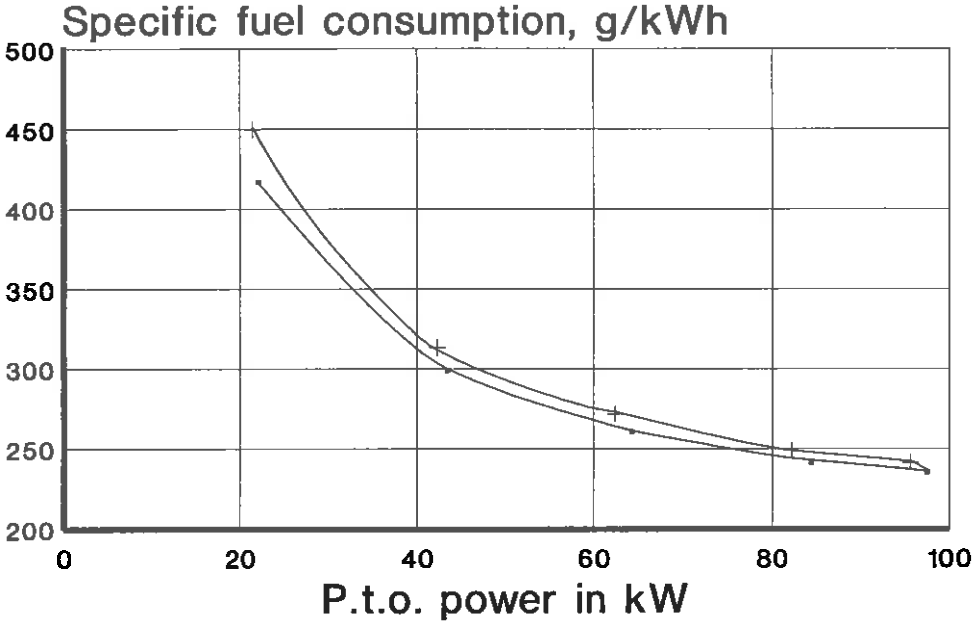


Figure 5. Power take-off test.