STÁTNÍ ZKUŠEBNA ZEMĚDĚLSKÝCH, POTRAVINÁŘSKÝCH A LESNICKÝCH STROJŮ

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Report on test in accordance with the O.E.C.D. STANDARD CODE 2 for the Official Testing of Agricultural and Forestry Tractors

Restricted Code

O.E.C.D approval № 2/1795

Date of approval: 24th November 1998



Agricultural Tractor

ZETOR 8641 Forterra turbo (4WD) 30 km/h version

Manufactured by: ZETOR a.s., CZ-632 00 Brno, Czech Republic

Report № 13464

Date of test: March – September 1998

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Tractor manufacturer's name and address:	ZETOR a.s., CZ-632 00 Brno, Czech Republic
Location of tractor assembly:	Brno, Czech Republic
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer
Place of running-in:	Brno, Czech Republic
Duration of running-in:	28 hours
Location of test:	SZZPLS Praha, Czech Republic

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

Make:	ZETOR
Model:	8641 Forterra turbo 30 km/h version
Type:	Wheeled, unit construction, all wheels drive
Number of driving wheels:	4
Serial №:	001 001
1st Serial №:	001 001

1.2 ENGINE

Make:	ZETOR
Model:	1203
Type:	4-stroke diesel engine, direct injection, water cooled, turbocharged
Serial №:	*1203-001001*

1.2.1 Cylinders

Number/disposition:	4, in-line, vertical
Bore/stroke:	105 mm/120 mm
Capacity:	4156 cm^3
Compression ratio:	17.0:1
Arrangement of valves:	Overhead
Cylinder liners:	Wet, replaceable

1.2.2 Supercharging

Make, model and type:	ČZ, C14 13, exhaust driven
Pressure:	210 kPa
Intercooler:	None

1.2.3 Fuel system

Fuel feed system:	Lift pump piston-type, integral with fuel injection pump
Make, model and type of fuel filter(s):	ATESO, 443 741 111 001, one-stage with paper cartridge
Capacity of fuel tank:	180 dm³
Make, model and type of injection pump:	MOTORPAL, PP4M10P1fN12207, in-line
Serial №:	V 9116
Manufacturer's production setting of injection pump	
Flow rate (rated engine speed and full load):	17.94 to 18.42 dm³/h
Timing:	14°+1° before TDC
Make, model and type of injectors:	MOTORPAL, VA 76S 160 3013, 4 hole
Injection pressure:	22.0-0.8 MPa

1.2.4 Governor

Make, model and type:	MOTORPAL, RV 3M 350 1100 3341, centrifugal, variable speed with overpressure corrector
Governed range of engine speed:	From 700 to 2460 rev/min
Rated engine speed:	2200 rev/min

1.2.5 Air cleaner

Pre-cleaner	
Make, model and type:	Integral with main cleaner, cyclon type
Location of air intake:	Under bonnet forward of radiator
Main cleaner	
Make, model and type:	SANDRIK, SPP 500, dry with paper primary and safety elements
Maintenance indicator:	Warning light on the dashboard

1.2.6 Lubrication system

Type of feed pump:	Gerotor
Type of filter(s):	Full flow with replaceable paper element
Number of filters:	1
Oil cooler:	Heat exchanger with engine coolant

1.2.7 Cooling system

Type of coolant:	Water and anti-freeze
Type of pump:	Centrifugal, belt driven
Specification of fan or blower:	Axial, belt driven
Number of fan blades:	8
Fan diameter:	460 mm
Coolant capacity:	23.5 dm³
Type of temperature control:	Thermostat
Superpressure system:	40±10 kPa

1.2.8 Starting system

Make, model and type:	MAGNETON, 443 115 144 763, electrical, solenoid engaged
Starter motor power rating:	3.5 kW
Cold starting aid:	Four electrical glow plugs
Safety device:	Forward/reverse lever in neutral position

1.2.9 Electrical system

Voltage:	12 V, negative earth
Generator	
Make, model and type:	MAGNETON, 443 113 516 673, alternator, belt driven
Power:	980 W
Battery of accumulators	
Number:	1
Rating:	135 Ah at 20 hours

1.2.10 Exhaust system

Make, model and type:	ZETOR, 10.014.000, expansion and absorption muffler
Location:	Left-hand side of engine, vertical

1.3 TRANSMISSION

1.3.1 Clutch

Make, model and type:	ZETOR, 10.021.000, dry plate for transmission only
Number of plates:	1
Diameter of plates:	325 mm
Method of operation:	Hydraulically by pedal

1.3.2 Gear box

Make, model and type:	ZETOR, 16.121.000, mechanical
Description:	Synchromesh gear box with 4 forward speeds with 3 ranges power shift (L, M and H), 2 reduction gears (Lo and Hi) and reverse group; speed 4 locked out in reverse operation

	Forward	Reverse
Number of gears	4	3
Number of groups	2	2
Number of ranges	3	3
Total of arrangements	24	18

Available options:	None
Oil cooler:	None

1.3.3 Rear axle and final drives

Make, model and type:	ZETOR, 16.154.000, crown wheel and bevel pinion differential and outboard planetary final drives
Differential lock	
Type:	Dog clutch, electro-pneumatically activated
Method of engagement:	Rocker switch on the dashboard
Method of disengagement:	Service brake pedal

1.3.4 Front axle

Make, model and type:	CARRARO, 20.19, crown wheel and bevel pinion differential and outboard planetary final drives
Differential lock	
Type:	Limited slip
Method of engagement:	Self-engaging
Method of disengagement:	Self-disengaging

1.3.5 Total ratios and travelling speeds

Gear №	Group	Range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed of 2200 rev/min km/h (*)
Forward				
1	Lo	L	406.982	1.62
		M	351.566	1.88
		H	304.067	2.17
2		L	282.745	2.33
		M	244.246	2.70
		H	211.246	3.12
3		L	174.038	3.79
		M	150.341	4.39
		H	130.029	5.07
4		L	121.573	5.42
		M	105.020	6.28
		H	90.831	7.26
1	Hi	L	98.437	6.70
		M	85.033	7.75
		H	73.545	8.97
2		L	68.388	9.64
		M	59.076	11.16
		H	51.094	12.90
3		L	42.095	15.66
		M	36.363	18.13
		H	31.450	20.97
4		L	29.405	22.42
		M	25.401	25.96
		H	21.969	30.01
(*) Calculated with a tyre dynamic radius index of 795 mm (ISO 4251-1:1992)				

Lo: Low group, Hi: High group, L: Low range, M: Medium range, H: High range

Number of revolutions of front wheels for one revolution of rear-wheels: 1.4424

1.3.5 Total ratios and travelling speeds (continued)

Gear №	Group	Range	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed of 2200 rev/min km/h (*)
Reverse				
1	Lo	L	351.984	1.87
		M	304.057	2.17
		H	262.977	2.51
2		L	244.536	2.70
		M	211.240	3.12
		H	182.700	3.61
3		L	150.520	4.38
		M	130.024	5.07
		H	112.457	5.86
1	Hi	L	85.134	7.74
		M	73.542	8.97
		H	63.606	10.37
2		L	59.146	11.15
		M	51.093	12.91
		H	44.190	14.92
3		L	36.406	18.11
		M	31.449	20.97
		H	27.200	24.24
(*) Calculated with a tyre dynamic radius index of 795 mm (ISO 4251-1:1992)				

Lo: Low group, Hi: High group, L: Low range, M: Medium range, H: High range

Number of revolutions of front wheels for one revolution of rear-wheels:	1.4424

1.4 POWER TAKE-OFF

1.4.1 Main power take-off

Type:	Independent
Method of engagement:	Electro-hydraulically actuated muliti-plate wet clutch operated by rocker switch, independent of main drive clutch
Number of shafts:	1
Method of changing power take-off shaft ends and speeds:	Manually by shaft turning

1.4.1.1 Power take-off proportional to engine speed

Location: At rear of tractor

P.T.O. type	Diameter of power take-off shaft end	Number of splines	In conformity with ISO 500:1991
	mm		
540	34.9	6	Yes
1000	34.9	21	Yes

Height above ground: 670 mm

Distance from the median plane of the tractor: 0 mm

Distance behind rear-wheel axis: 480 mm

P.T.O. type	P.T.O. speed	Engine speed	Ratio of rotation speeds (engine speed/p.t.o. speed)	Power restriction/Maximum torque transmissible
	rev/min	rev/min		kW/Nm
540	540	1913	3.5431	53.0 kW/937.2 Nm
	621	2200		
1000	1000	1950	1.9500	None
	1128	2200		

Direction of rotation (viewed from behind tractor): Clockwise

1.4.1.2 Power take-off proportional to ground speed

Indicate	Group	Travelling distance for one revolution of power take-off shaft	Number of power take-off shaft revolutions for one revolution of (rear) driving wheels
rev/min		m	
540	Lo	0.171	29.1611
	Hi	0.708	7.0532
1000	Lo	0.094	52.9846
	Hi	0.390	12.8154

Lo: Low group, Hi: High group

Direction of rotation with forward gear engaged (viewed from behind tractor): Clockwise

1.4.2 Optional power take-off (on request available, not fitted to tested tractor)

Type: Independent

Method of engagement: Electro-hydraulically actuated muliti-plate wet clutch operated by rocker switch, independent of main drive clutch

Number of shafts: 1

Method of changing power take-off speeds: None

1.4.2.1 Power take-off proportional to engine speed

Location: At front of tractor

P.T.O. type	Diameter of power take-off shaft end	Number of splines	In conformity with ISO 500:1991
	mm		
1000	34.9	21	Yes

Height above ground: 699 mm

Distance from the median plane of the tractor: 0 mm

Distance in front front-wheel axis: 664 mm

P.T.O. type	P.T.O. speed	Engine speed	Ratio of rotation speeds (engine speed/p.t.o. speed)	Power restriction/Maximum torque transmissible
	rev/min	rev/min		kW/Nm
1000	1000	1955	1.9545	35.0/334.2
	1126	2200		

Direction of rotation (viewed from face tractor): Clockwise

1.4.2.2 Power take-off proportional to ground speed

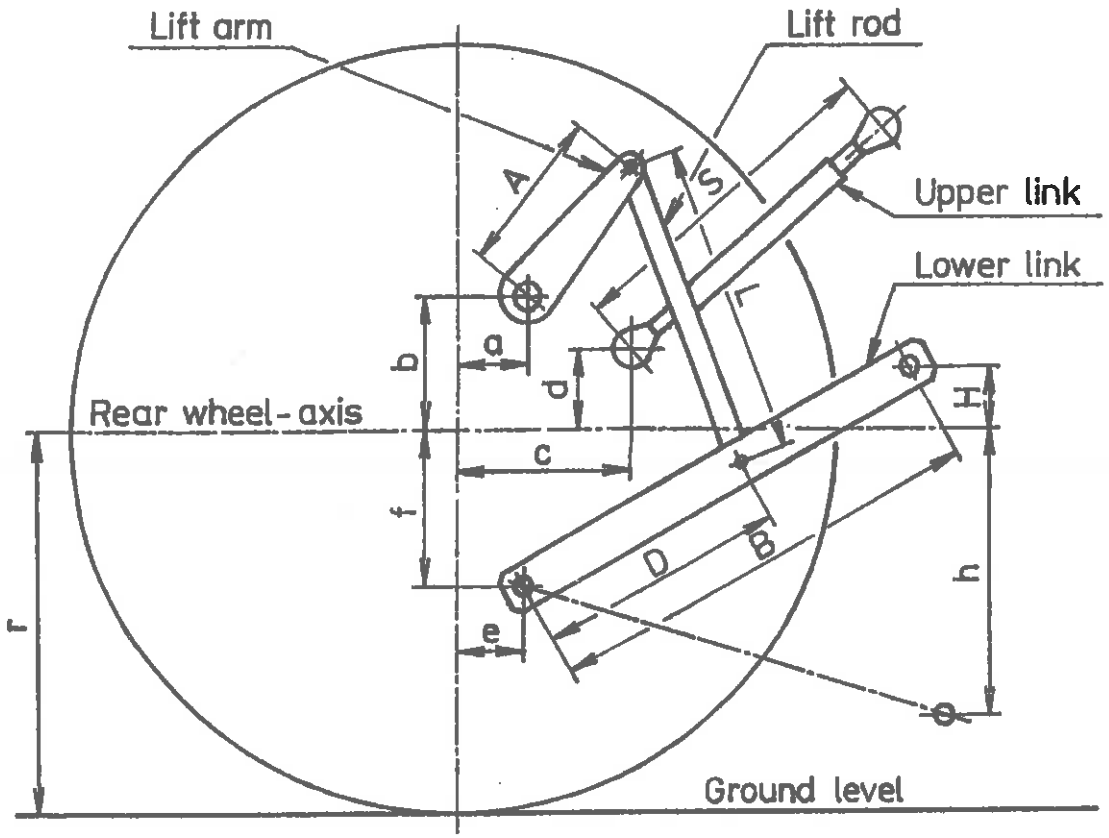
None

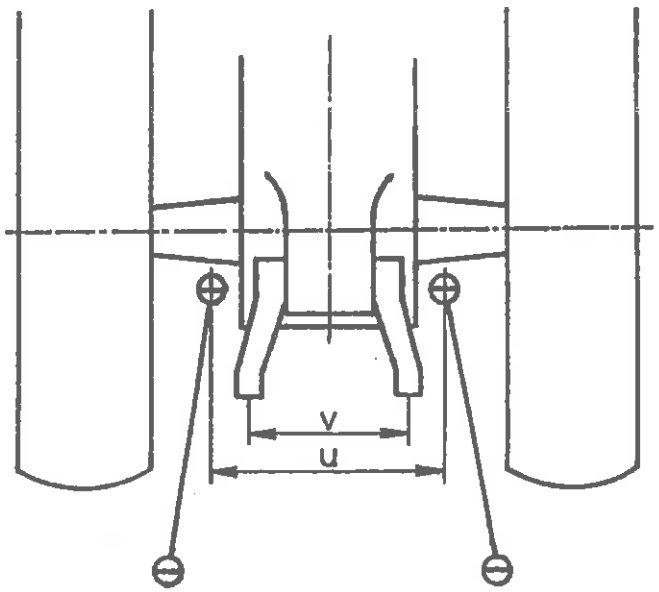
1.5 HYDRAULIC POWER LIFT

Make, model and type:	ZETOR, 10.940.404, hydraulic with mechanical position, draft or mixed control, top link sensing
Type of hydraulic system:	Open centre
Type and number of cylinders:	1 integral single-acting and 1 external single-acting
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting (tolerance):	18.0+0.2 MPa
Opening pressure of cylinder safety valve:	21.0+2.0 MPa
Lift pump type:	Gear pump
Transmission between pump and engine:	Gear driven from engine
Type and number of filters:	1 magnetic and 1 screen filter in suction side and 1 full flow filter with replaceable paper cartridge in delivery side of pump of gear box
Site of oil reservoir:	Transmission housing
Type, number and location of tapping points:	ISO standard couplings 12.5 mm, 3 double acting control valves, 6 pressure and 1 return couplings at rear of tractor
Maximum volume of oil available to external cylinders:	20 dm^3

1.6 THREE-POINT LINKAGE

Category:	2, in conformity with ISO 730-1:1994
Category adapter:	None





Linkage geometry dimensions:

			Dimension or range	Settings used in test
			mm	mm
Length of lift arms		(A)	330	330
Length of lower links		(B)	892	892
Distance of lift arm pivot point from rear-wheel axis:	horizontally	(a)	150	150
	vertically	(b)	275	275
Horizontal distance between the 2 lower link points		(u)	510	510
Horizontal distance between the 2 lift arm end points		(v)	590	590
Length of upper link		(S)	600 to 870	672
Distance of upper link pivot point from rear-wheel axis:	horizontally	(c)	380	380
	vertically	(d)	124, 164, 204, 239	164
Distance of lower link pivot point from rear-wheel axis:	horizontally	(e)	150	150
	vertically	(f)	245	245
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	500	500
Length of lift rods		(L)	588 to 724	626
Height of lower hitch points relative to the rear-wheel axis:				
	in low position	(h)	521 to 793	595
	in high position	(H)	-44 to 180	125
Height above ground of lower hitch points when locked in transport position (*)			Any height withing lift range	
(*) Assuming r=795 mm tyre dynamic radius index of ISO 4251-1:1992				

1.7 SWINGING DRAWBAR

Type:	Clevis
Height above ground	
Maximum:	403 mm
Minimum:	403 mm
Type of adjustment:	None
Distance of hitch point from rear-wheel axis, horizontally:	879 mm
Distance of hitch point from power take-off shaft end	
Vertically:	267 mm
Horizontally:	399 mm
Lateral adjustment (centre of clevis)	
Right-hand:	80 mm
Left-hand:	80 mm
Distance of pivot point from rear-wheel axis, horizontally:	201 mm to rear
Diameter of drawbar pin hole:	31 mm
Maximum vertical permissible load:	12 kN

1.8 TRAILER HITCH

Type:	Automatic clevis
Hole diameter:	35 mm
Height above ground:	695, 795 and 895 mm
Distance of hitch point from rear-wheel axis, horizontally:	860 mm
Distance of hitch point from power take-off shaft end	
Vertically:	25, 125 and 225 mm
Horizontally:	380 mm
Maximum vertical permissible load:	10 kN

1.9 HOLED DRAWBAR (on request available, not fitted to tested tractor)

Number of holes:	7
Distance between holes:	80 mm
Hole diameter:	32 mm
Thickness/width of the drawbar:	2×20 mm/90 mm
Height above ground	
Maximum:	920 mm
Minimum:	200 mm
Horizontal distance to power take-off shaft end (rear):	562 mm

1.10 SEMI-TRAILER HITCH

Type:	Towing hook
Hole diameter:	47 mm
Height above ground:	428 mm
Distance of hitch point from rear-wheel axis, horizontally:	584 mm
Distance of hitch point from power take-off shaft end	
Vertically:	242 mm
Horizontally:	104 mm
Maximum vertical permissible load:	18 kN

1.11 FRONT TOWING HITCH

Height above ground:	847 mm
Diameter of pin hole:	28 mm

1.12 STEERING

Make, model and type:	DANFOSS, 125 ON 150 N2019 or EATON, 261-1356-002, hydrostatic
Method of operation:	Independent hydraulic circuit for steering
Pump(s):	Gear pump, driven from engine
Ram(s):	Double-acting cylinder on the front axle, simmetrical design
Working pressure:	12.5 MPa

1.13 BRAKES

1.13.1 Service brake

Rear axle

Make, model and type:	ZETOR, 16.227.000, wet disc, multiplate, 4 discs on each side
Method of operation:	Hydraulically by pedals, coupled or independent
Front axle:	None
Trailer braking take-off:	Combined one line and two line air braking system and hydraulic braking system, actuated by tractor pedals

1.13.2 Parking brake

Type:	Common with service brake
Method of operation:	Mechanically by hand lever with ratchet

1.14 WHEELS

Number

Front:	2, steering and driving
Rear:	2, driving
Wheelbase:	2388 mm

Track width adjustment:

	Minimum	Maximum	Adjustment method
	mm	mm	
Front	1635	1875	Reversing wheels and off-set lug rims
Rear	1505	1800	Reversing wheels and off-set lug rims

1.15 PROTECTIVE STRUCTURE

Make, model and type:	ZETOR, UBK 7621, cab with integrated safety frame
Manufacturer's name and address:	ZETOR a.s., CZ-632 00 Brno, Czech Republic
Protective device	
Cab/frame/rollguard/other:	Cab
Tiltable/not tiltable:	Not tiltable
O.E.C.D. approval	
Approval number:	4/0 527
Date of approval:	4th June 1998
Nos. of minor modification certificates, if any:	None

1.16 SEAT

1.16.1 Driver's seat

Make, model and type:	MARS, Zetor 7211-5400, upholstered seat
Seat and steering wheel reversible:	No
Type of suspension:	Parallelogram linkage adjustable for driver's weight
Type of damping:	Hydraulic
Range of adjustment	
Longitudinally:	150 mm
Vertically:	60 mm
Safety belt:	No

1.16.2 Optional driver's seat(s)

Make	Model	Type of suspension	Type of damping	Range of adjustment	
				Longitudinally	Vertically
				mm	mm
COBO-MT	SC80 1204 B4	Mechanic	Hydraulic	160	110
COBO-MT	SC81 1204 G4	Mechanic	Hydraulic	160	110
COBO-MT	SC81 1213 G4	Mechanic	Hydraulic	160	110
COBO-MT	SC90 1318 B4	Mechanic	Hydraulic	160	110
GRAMMER	DS 85H/3A	Mechanic	Hydraulic	150	60
GRAMMER	DS 85H1/90A	Mechanic	Hydraulic	150	60

Type:	Upholstered seat with back rest
Safety belt:	No

1.16.3 Passenger seat

None

1.17 LIGHTING

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights	1255	145×80	215
Sidelights	1615	60×65	650
Rearlights	1825	140×40	815
Reflectors	1095	Ø78	855

2. TEST CONDITIONS

2.1 OVERALL DIMENSIONS (unballasted tractor)

Length	Width		Height at top of	
	minimum	maximum	protective structure	exhaust pipe
mm	mm	mm	mm	mm
4300	2050	2275	2685	2805

2.2 GROUND CLEARANCE (unballasted tractor): 340 mm

Clearance-limiting part: Swinging drawbar bracket

2.3 TRACTOR MASS (unballasted tractor with cab)

	Without driver	With driver
	kg	kg
Front	1540	1555
Rear	2510	2570
Total	4050	4125

2.4 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
Make	BARUM	BARUM
Model	TZR 2	TZR 2
Dimensions	13.6 R 24	16.9 R 38
Ply rating	121 A8	141 A8
Type	Radial	Radial
Maximum load (tyre manufacturer's)	15.52 kN	27.55 kN
Maximum load (tractor manufacturer's)	12.50 kN	27.50 kN
Inflation pressure (tyre manufacturer's)	160 kPa	160 kPa
Dynamic radius index	560 mm	795 mm
Chosen track width:	1635 mm	1505 mm

2.5 FUEL

Type:	Diesel fuel, in conformity with national standard ČSN EN 590
Density at 15 °C:	0.832 g/cm³ for p.t.o. tests 0.840 g/cm³ for drawbar tests

2.6 OILS AND LUBRICATIONS

2.6.1 Capacity and change interval

	Capacity	Oil change	Filter change
	dm³	h	h
Engine	10.0	200	200
Gear box	40.0	1200	1200
Front axle	6.5	1200	-
Rear axle		Common with gear box	
Final drive (front)	2×0.6	1200	-
Final drive (rear)		Common with gear box	
Hydraulic system		Common with gear box	
Steering	4.5	2400	2400

2.6.2 Specifications

	Recommended	Used during test
Engine oil: Type Viscosity Classification	 SAE 15W-40 13.8 cSt at 100 °C API SF/CC	As recommended
Transmission oils: Type Viscosity Classification	 SAE 80W 7.5 cSt at 100 °C API GL-4	As recommended
Steering oil: Type Viscosity Classification	 OH – HM32 28.8 cSt at 40 °C ISO 6743-L-HM32	As recommended

Hydraulic fluid: Same as transmission

2.6.3 Grease

Number of lubrication points: 20

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 27th March 1998, SZZPLS Praha

Type of dynamometer bench: FROUDE AG 400, eddy-current

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
3.1.1 MAXIMUM POWER - TWO-HOUR TEST						
56.4	2049	1051	15.13	18.19	268	3.10
3.1.2 POWER AT RATED ENGINE SPEED						
53.4	2200	1128	15.29	18.38	286	2.91
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
55.6	1950	1000	14.58	17.52	262	3.17
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
53.4	2200	1128	15.29	18.38	286	2.91
3.1.4.2 85 % of torque obtained in 3.1.4.1						
46.1	2233	1145	13.96	16.78	303	2.75
3.1.4.3 75 % of torque defined in 3.1.4.2						
35.0	2264	1161	11.96	14.38	342	2.43
3.1.4.4 50 % of torque defined in 3.1.4.2						
23.6	2289	1174	9.90	11.90	419	1.98
3.1.4.5 25 % of torque defined in 3.1.4.2						
11.9	2307	1183	7.82	9.40	657	1.27
3.1.4.6 unloaded						
-	2340	1200	5.76	6.92	-	-

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
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min] 3.1.5.1 the torque corresponding to maximum power						
55.6	1950	1000	14.58	17.52	262	3.17
3.1.5.2 85 % of torque obtained in 3.1.5.1						
50.0	2063	1058	13.78	16.56	276	3.02
3.1.5.3 75 % of torque defined in 3.1.5.2						
38.2	2100	1077	11.59	13.93	303	2.74
3.1.5.4 50 % of torque defined in 3.1.5.2						
25.8	2133	1094	9.41	11.31	365	2.28
3.1.5.5 25 % of torque defined in 3.1.5.2						
13.1	2159	1107	7.22	8.68	551	1.51
3.1.5.6 unloaded						
-	2184	1120	5.06	6.08	-	-

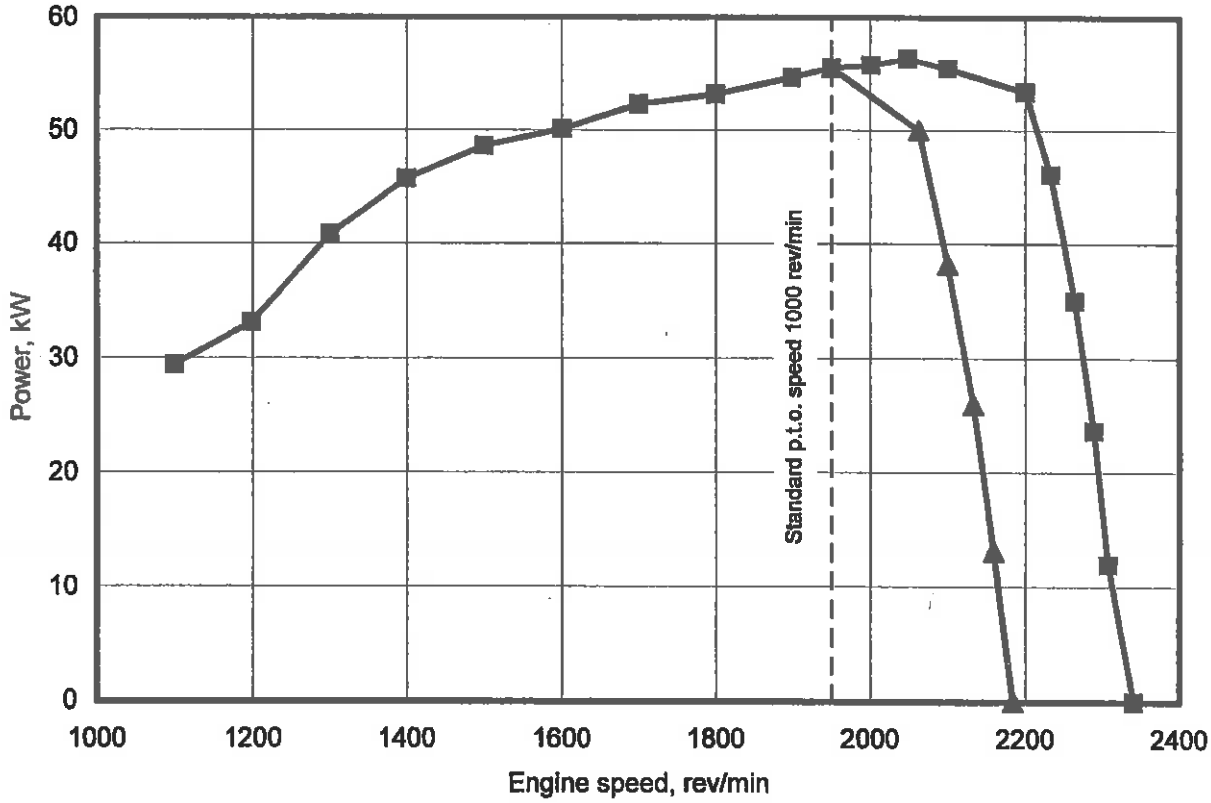
No load maximum engine speed: 2340 rev/min

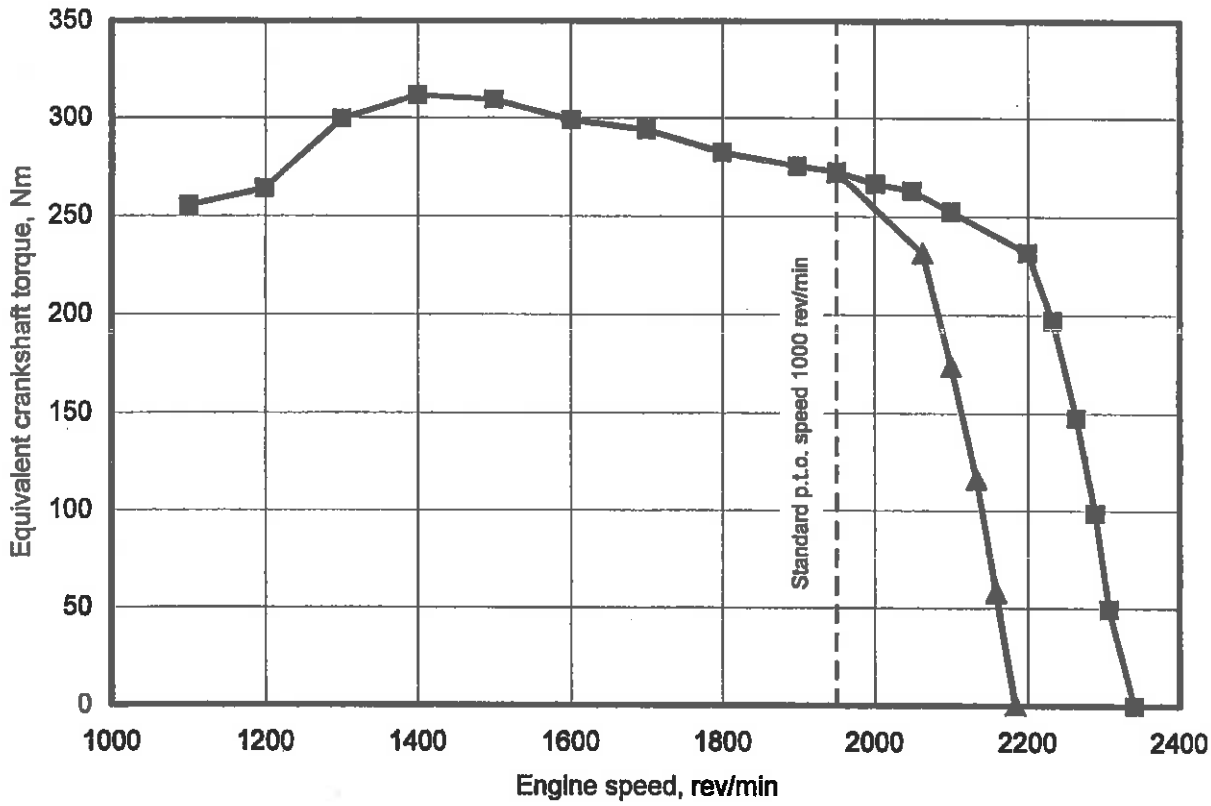
Torque (equivalent crankshaft)
At maximum power: 262.9 Nm
At rated engine speed: 231.8 Nm
At standard power take-off speed: 272.3 Nm

Maximum torque (equivalent crankshaft): 311.7 Nm
(engine speed: 1400 rev/min)

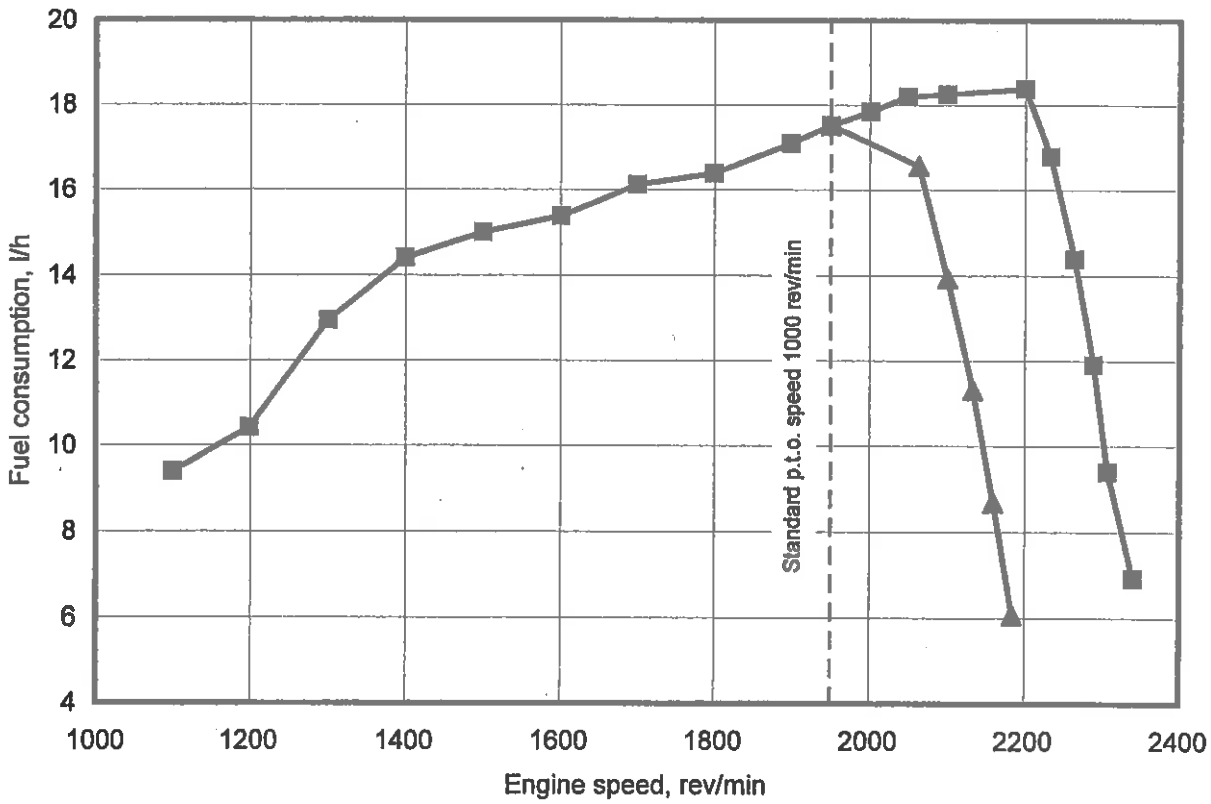
Mean atmospheric conditions:	
Temperature	23 °C
Pressure	97.3 kPa
Relative humidity	30 %
Maximum temperatures:	
Coolant	80 °C
Engine oil	103 °C
Fuel	43 °C
Engine air intake	31 °C

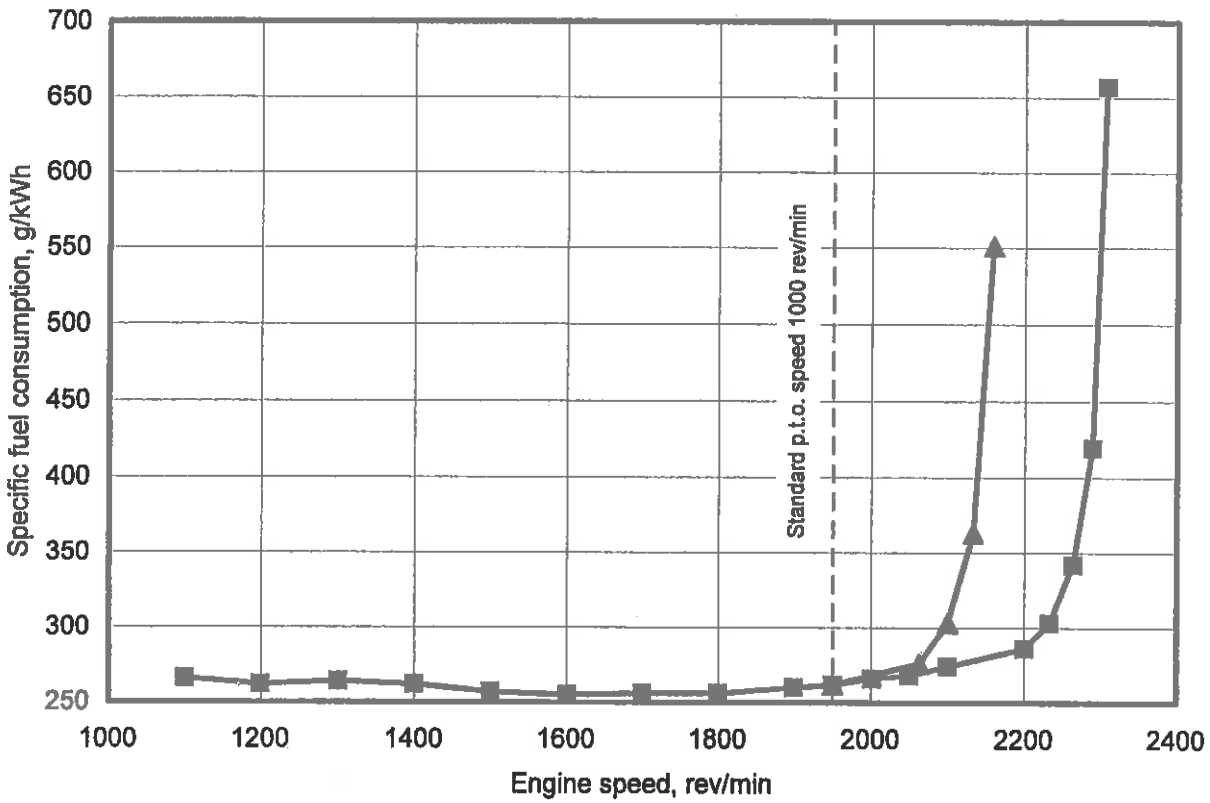
POWER TAKE-OFF TEST



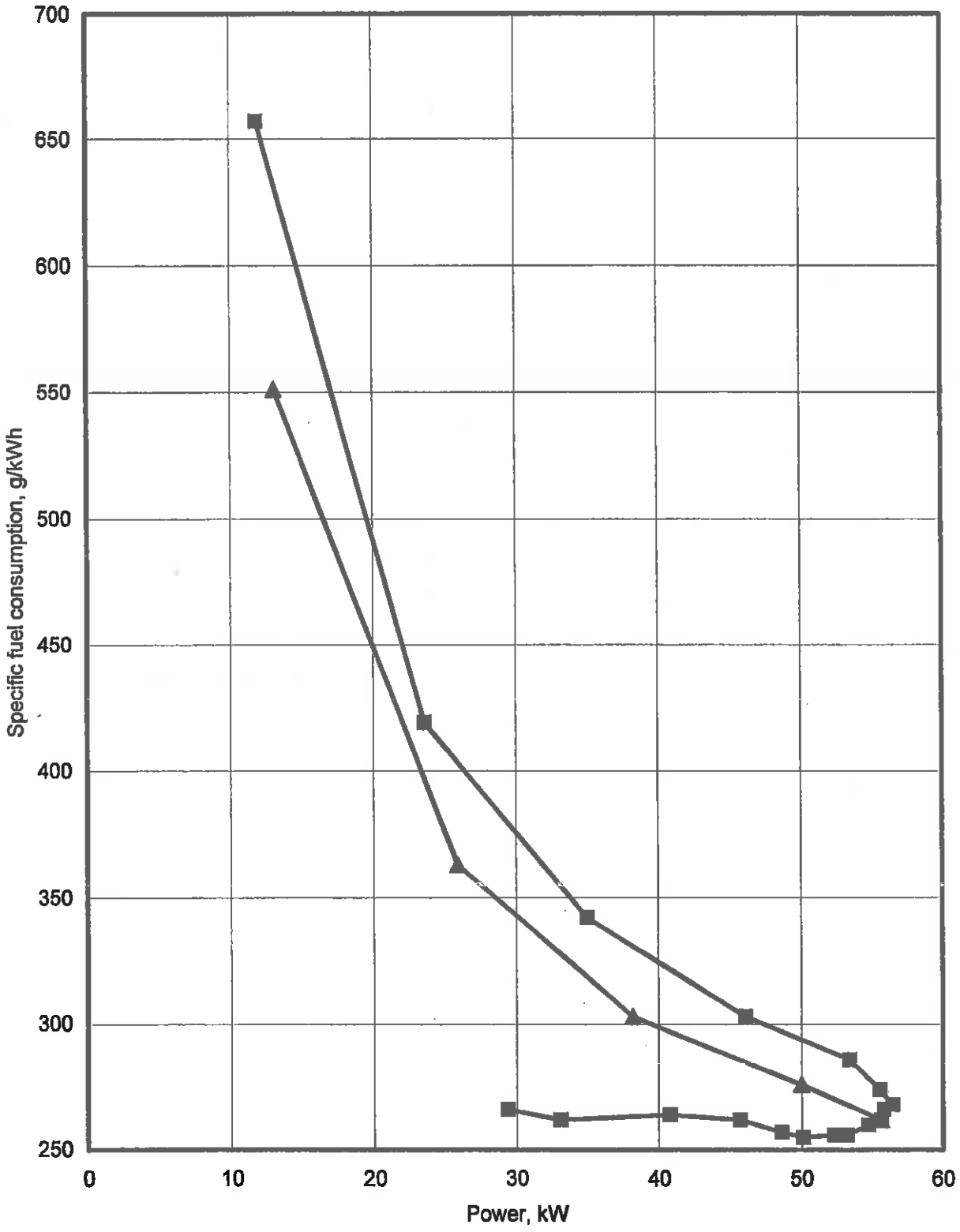


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 24th April 1998

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 18.8 MPa

Pump stalled: Yes

Pump delivery rate at minimum pressure: 57.0 l/min

	Flow rate	Pressure	Power
	l/min	MPa	kW
Flow rate corresponding to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting and corresponding hydraulic power	44.0	16.9	12.4
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	50.0	16.4	13.7

Tapping point used for test: External tapping

Temperature of hydraulic fluid: 66 °C

Opening pressure of the unloading valve: Not applicable

Closing pressures of the unloading valve: Not applicable

3.2.2 Power lift test

Linkage setting for test - see page 12

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	200 mm
Vertical movement: without lifting force	720 mm	896 mm
with lifting force	674 mm	811 mm
Maximum corrected force exerted through full range	47.5 kN	39.6 kN
Corresponding pressure of hydraulic fluid	16.9 MPa	16.9 MPa
Moment about rear-wheel axis	49.5 kNm	65.4 kNm
Maximum tilt angle of mast from vertical	-	11 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points													
mm	-405	-400	-350	-300	-200	-100	0	+100	+200	+300	+324	+400	+406
Lifting forces at the hitch points (the values of force measured shall be corrected to correspond to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting of the hydraulic lift system)													
kN	-	-	47.5	48.6	51.7	53.5	55.4	55.2	55.9	57.2	57.7	-	-
Corresponding pressure: 16.9 MPa													
Lifting forces at the test frame													
kN	43.7	43.7	-	45.2	45.2	45.3	45.2	44.1	42.6	41.3	-	39.9	39.6
Corresponding pressure: 16.9 MPa													

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 22nd September 1998

Type of track: Bituminous-concrete surface

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
403	120	120

Gear number and group	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption
	kW	kN	km/h	rev/min	%	g/kWh
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)						
3 Lo L	32.7	36.5	3.23	2218	14.9	405
3 Lo M	37.9	36.8	3.71	2197	15.0	383
3 Lo H	41.4	36.8	4.05	2076	15.0	346
4 Lo L	43.4	35.1	4.45	2051	11.5	333
4 Lo M	45.6	30.4	5.40	2048	7.6	321
1 Hi L	46.0	28.8	5.75	2045	7.1	321
4 Lo H	46.1	26.0	6.38	2050	5.1	320
1 Hi M	46.8	24.6	6.85	2051	4.8	314
1 Hi H	46.5	20.8	8.04	2055	3.5	316
2 Hi L	45.9	19.1	8.66	2053	3.2	323
2 Hi M	44.6	16.0	10.03	2051	3.1	330
2 Hi H	43.8	13.5	11.68	2043	2.0	335
3.3.2 FUEL CONSUMPTION 3.3.2.1 in selected gear, at maximum power at rated speed						
1 Hi M	42.4	20.5	7.45	2199	3.4	341
3.3.2.1.1 75 % of pull at maximum power at rated speed						
1 Hi M	32.7	15.4	7.64	2234	2.5	389
3.3.2.1.2 50 % of pull at maximum power at rated speed						
1 Hi M	22.3	10.3	7.79	2263	1.8	479
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1						
1 Hi H	32.5	15.4	7.60	1916	2.5	340
3.3.2.1.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2						
1 Hi H	22.3	10.4	7.73	1946	1.8	411
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed						
4 Lo H	38.3	19.7	7.00	2200	3.3	363
3.3.2.2.1 75 % of pull at maximum power at rated speed						
4 Lo H	29.5	14.8	7.17	2236	2.4	423
3.3.2.2.2 50 % of pull at maximum power at rated speed						
4 Lo H	20.0	9.9	7.29	2264	1.7	525
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1						
1 Hi M	29.6	14.8	7.21	2099	2.4	380
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2						
1 Hi M	20.3	10.0	7.29	2105	1.7	457

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2.08	47	79	95	11	99	98.9
2.19	47	80	96	11	97	98.9
2.43	47	84	96	13	94	98.9
2.52	47	86	96	13	90	98.9
2.62	47	85	97	14	87	98.9
2.62	47	82	92	14	85	98.9
2.63	48	85	97	15	81	98.9
2.67	49	86	98	15	74	98.9
2.66	49	84	97	15	73	98.9
2.60	45	83	92	17	64	98.9
2.55	49	83	96	16	65	98.9
2.50	50	84	97	16	61	98.9
2.46	49	87	95	15	74	98.9
2.16	50	84	96	17	61	98.9
1.75	52	84	96	17	61	98.9
2.47	48	83	94	17	61	98.9
2.04	48	83	92	17	61	98.9
2.32	49	84	94	15	81	98.9
1.99	49	84	94	17	61	98.9
1.60	51	83	95	17	61	98.9
2.21	48	84	94	16	61	98.9
1.84	50	85	93	16	61	98.9

4. OPTIONAL TESTS RESULTS

4.1 BRAKING

Date of tests: 2nd September 1998

Tractor mass (with driver)

	Front	Rear	Total
	kg	kg	kg
Ballasted tractor	2500	5500	8000
Unballasted tractor	1555	2570	4125

4.1.1 Cold service braking device test

	Speed before application of brakes	Braking device control force	Mean deceleration
	km/h	N	m/s²
Ballasted tractor	30.1	100	0.37
		195	1.37
		290	2.21
		400	3.03
		455	3.21
Unballasted tractor	30.4	100	8.86
		160	1.68
		195	2.09
		260	2.76
		280	3.01

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

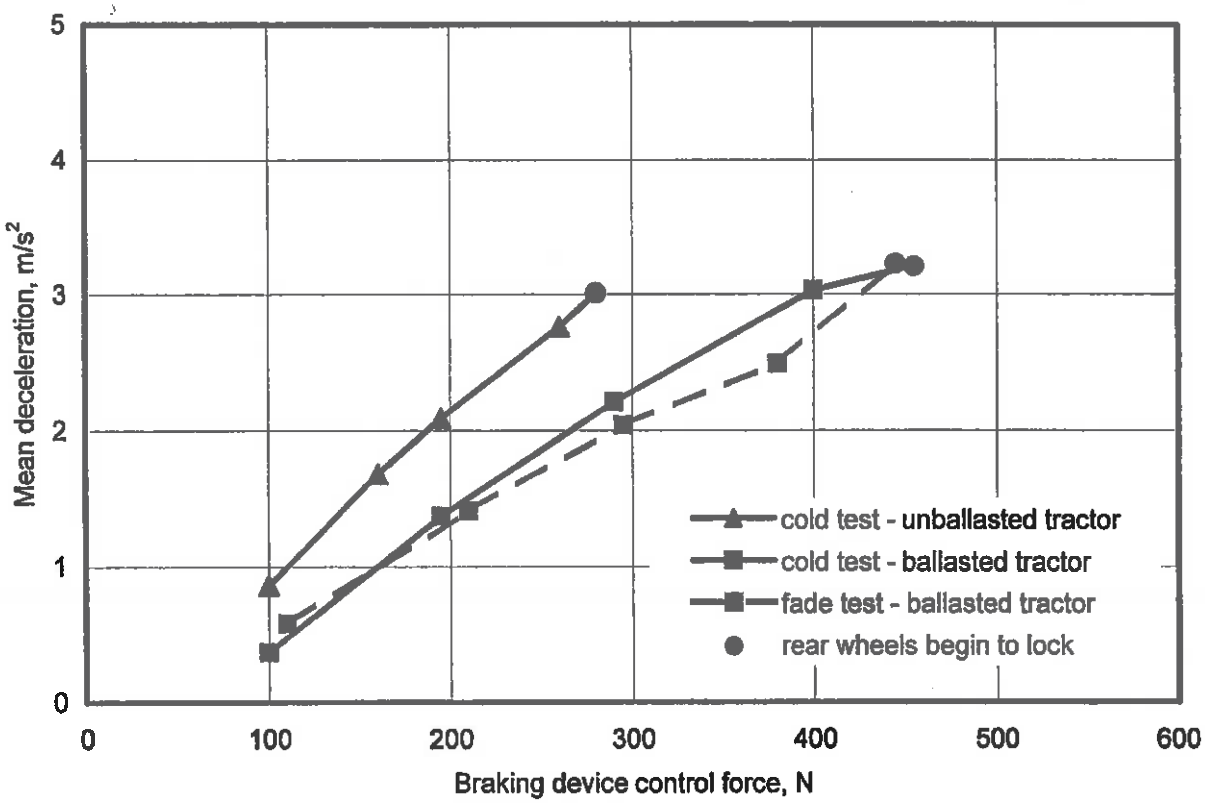
4.1.2 Fade test

	Speed before application of brakes	Braking device control force	Mean deceleration
	km/h	N	m/s²
Ballasted tractor	30.1	110	0.58
		210	1.41
		295	2.04
		380	2.49
		445	3.23

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

Brake heating method: Driven with brakes applied for 1 km at 80 % of maximum speed with a pedal force corresponding to a deceleration of 1 m/s²



4.1.3 Parking braking device test

	Ballasted tractor on 18 % slope	
	Uphill	Downhill
	N	N
Braking device control force	210	200

4.2 MEASUREMENT OF EXTERNAL NOISE

Date of tests: 6th August 1998

Make and model of sound level meter: BRÜEL & KJÆR, 2231

Type of track: Bituminous-concrete surface

4.2.1 According to OECD standard code 1

Gear number: 4 Hi H

Travelling speed before acceleration: 24.0 km/h

Sound level: 86.0 dB(A)

4.2.2 According to EEC directives 74/151/EEC (Annex VI) and 88/410/EEC

Gear number: 4 Hi H

Travelling speed before acceleration: 24.0 km/h

Sound level: 85.0 dB(A)

5. REPAIRS

None

6. REMARKS

None

Test carried out by: Dipl. Ing. Peter Pernis

Head of the Tractor Laboratory

Dipl. Ing. Peter Pernis

Director

Dipl. Ing. Vladimír Hanzlík