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 № 2/1793

Date of approval: 20th November 1998



Agricultural Tractor

ZETOR 11641 Forterra (4WD) 40 km/h version

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

Report № 13868

Date of test: July – November 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:	11641 Forterra 40 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:	SAME DEUTZ-FAHR GROUP
Model:	1000.6W2
Type:	4-stroke diesel engine, direct injection, water cooled, naturally aspirated
Serial №:	*1000.6W2PRM0248*

1.2.1 Cylinders

Number/disposition:	6, in-line, vertical
Bore/stroke:	105.0 mm/115.5 mm
Capacity:	6001 cm³
Compression ratio:	17.0:1
Arrangement of valves:	Overhead
Cylinder liners:	Without liners

1.2.2 Supercharging

None

1.2.3 Fuel system

Fuel feed system:	Lift pump membrane-type
Make, model and type of fuel filter(s):	FIAMM, FNA 225/10, two-stage with paper cartridge
Capacity of fuel tank:	180 dm³

Make, model and type of injection pump:	BOSCH, PFR 1K 90A 543, in-line, immersed pump, one per cylinder
Serial №:	Not given
Manufacturer's production setting of injection pump	
Flow rate (rated engine speed and full load):	23.90 dm³/h
Timing:	13.0°+0.5° before TDC
Make, model and type of injectors:	BOSCH, DLLA 155S 1323, multihole
Injection pressure:	18.0+0.8 MPa

1.2.4 Governor

Make, model and type:	SAME DEUTZ-FAHR GROUP, 065 1651 0, centrifugal, variable speed
Governed range of engine speed:	From 675 to 2510 rev/min
Rated engine speed:	2350 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:	Gear
Type of filter(s):	Full flow with replaceable paper element
Number of filters:	2
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:	6
Fan diameter:	460 mm
Coolant capacity:	18.5 dm³
Type of temperature control:	Thermostat
Superpressure system:	40±10 kPa

1.2.8 Starting system

Make, model and type:	MAGNETI MARELLI, 2.9619.340.0, electrical, solenoid engaged
Starter motor power rating:	3.5 kW

Cold starting aid: Intake air heating-up

Safety device: Forward/reverse lever in neutral position

1.2.9 Electrical system

Voltage: 12 V, negative earth

Generator

Make, model and type: ISKRA, AAK 5363, alternator, belt driven

Power: 910 W

Battery of accumulators

Number: 1

Rating: 165 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: Heat exchanger with air

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:	Dog clutch, electro-pneumatically activated
Method of engagement:	Rocker switch on the dashboard
Method of disengagement:	Service brake pedal

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 2350 rev/min **km/h (*)**
Forward				
1	Lo	L	366.550	1.98
		M	316.639	2.29
		H	273.859	2.65
2		L	254.655	2.85
		M	219.981	3.30
		H	190.260	3.82
3		L	156.748	4.63
		M	135.405	5.37
		H	117.111	6.20
4		L	109.496	6.63
		M	94.586	7.68
		H	81.807	8.88
1	Hi	L	88.657	8.19
		M	76.585	9.49
		H	66.238	10.97
2		L	61.594	11.79
		M	53.207	13.65
		H	46.018	15.79
3		L	37.913	19.16
		M	32.750	22.18
		H	28.326	25.65
4		L	26.484	27.43
		M	22.878	31.75
		H	19.787	36.71
(*) Calculated with a tyre dynamic radius index of 820 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:	1.4490

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 2350 rev/min km/h (*)
Reverse				
1	Lo	L	317.016	2.29
		M	273.850	2.65
		H	236.851	3.07
2		L	220.243	3.30
		M	190.254	3.82
		H	164.549	4.41
3		L	135.566	5.36
		M	117.107	6.20
		H	101.285	7.17
1	Hi	L	76.677	9.47
		M	66.236	10.97
		H	57.287	12.68
2		L	53.270	13.64
		M	46.017	15.79
		H	39.799	18.25
3		L	32.789	22.16
		M	28.325	25.65
		H	24.498	29.65
(*) Calculated with a tyre dynamic radius index of 820 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: 1.4490

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: 695 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
	663	2350		
1000	1000	1950	1.9500	None
	1205	2350		

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	0.196	26.2640
	Hi	0.811	6.3525
1000	Lo	0.108	47.7208
	Hi	0.446	11.5422

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: 709 mm

Distance from the median plane of the tractor: 0 mm

Distance in front front-wheel axis: 658 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	60.0/573.0
	1202	2350		

Direction of rotation (viewed from face tractor): Clockwise

1.4.2.2 Power take-off proportional to ground speed

None

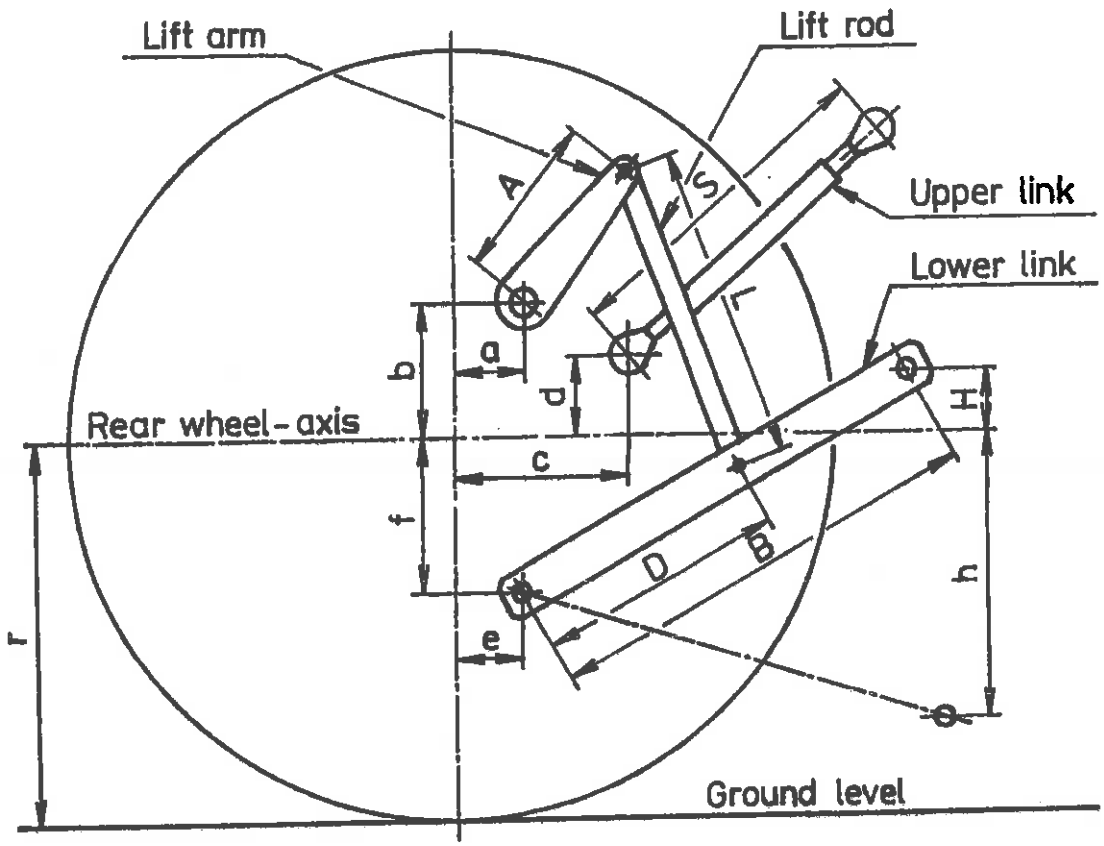
1.5 HYDRAULIC POWER LIFT

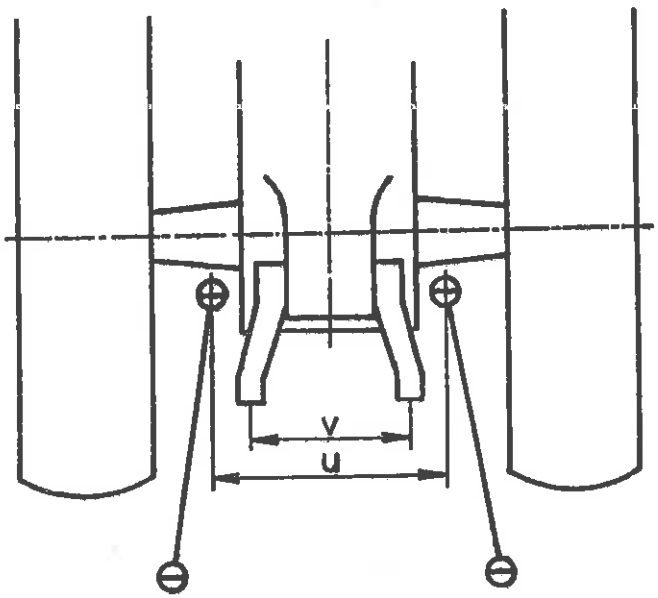
Make, model and type:	ZETOR, 10.450.000, hydraulic with electronical position, draft or mixed control, lower link sensing
Type of hydraulic system:	Open centre
Type and number of cylinders:	1 integral single-acting and 1 external single-acting
Type of linkage lock for transport:	Hydraulic
Relief valve 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)	955	955
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)	670 to 915	759
Distance of upper link pivot point from rear-wheel axis:	horizontally	(c)	358	358
	vertically	(d)	125, 195	125
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)	535	535
Length of lift rods		(L)	644 to 685	658
Height of lower hitch points relative to the rear-wheel axis:				
	in low position	(h)	590 to 681	620
	in high position	(H)	35 to 110	91
Height above ground of lower hitch points when locked in transport position (*)			Any height withing lift range	
(*) Assuming r=820 mm tyre dynamic radius index of ISO 4251-1:1992				

1.7 SWINGING DRAWBAR

Type: Clevis

Height above ground
- Maximum: 428 mm
- Minimum: 428 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:	710, 810 and 910 mm
Distance of hitch point from rear-wheel axis, horizontally:	860 mm
Distance of hitch point from power take-off shaft end	
Vertically:	15, 115 and 215 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:	911 mm
Minimum:	200 mm
Horizontal distance to power take-off shaft end (rear):	625 mm

1.10 SEMI-TRAILER HITCH

Type:	Towing hook
Hole diameter:	47 mm
Height above ground:	453 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:	25 kN

1.11 FRONT TOWING HITCH

None

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, 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

Make, model and type:	ZETOR, 16.225.000, dry disc on the drive shaft to the front axle
Method of operation:	Hydraulically by coupled pedals
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:	2643 mm

Track width adjustment:

	Minimum	Maximum	Adjustment method
	mm	mm	
Front	1625	1950	Reversing wheels and off-set lug rims
Rear	1510	1805	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:	GRAMMER, DS 85H1/90A, upholstered seat with back rest
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
MARS	Zetor 7211-5400	Mechanic	Hydraulic	150	60

Type:	Upholstered seat with back rest
Safety belt:	No

1.16.3 Passenger seat

Location:	Left-hand side of driver
Capacity (number):	1

1.17 LIGHTING

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights	1285	145×80	215
Sidelights	1655	60×65	700
Rearlights	1845	140×40	815
Reflectors - 1st pair	1360	Ø78	890
Reflectors - 2nd pair	865	Ø78	440

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
4550	2205	2365	2735	2835

2.2 GROUND CLEARANCE (unballasted tractor): 367 mm

Clearance-limiting part: Swinging drawbar bracket

2.3 TRACTOR MASS (unballasted tractor with cab)

	Without driver	With driver
	kg	kg
Front	1790	1805
Rear	2820	2880
Total	4610	4685

2.4 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
Make	BARUM	TAURUS
Model	TZ 19	Point 7
Dimensions	14.9-24	520/70 R 38
Ply rating	8 PR	150 A8 (147 B)
Type	Diagonal	Radial
Maximum load (tyre manufacturer's)	14.08 kN	33.50 kN
Maximum load (tractor manufacturer's)	15.00 kN	27.50 kN
Inflation pressure (tyre manufacturer's)	180 kPa	160 kPa
Dynamic radius index	590 mm	820 mm
Chosen track width:	1625 mm	1740 mm

2.5 FUEL

Type:	Diesel fuel, in conformity with national standard ČSN EN 590
Density at 15 °C:	0.840 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	15.5	150	300
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: 18

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 2nd July 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						
69.9	2299	1179	20.05	23.87	287	2.93
3.1.2 POWER AT RATED ENGINE SPEED						
69.3	2350	1205	20.08	23.90	290	2.90
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
65.4	1950	1000	17.76	21.14	272	3.09
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
69.3	2350	1205	20.08	23.90	290	2.90
3.1.4.2 85 % of torque obtained in 3.1.4.1						
59.9	2391	1226	17.40	20.71	290	2.89
3.1.4.3 75 % of torque defined in 3.1.4.2						
45.8	2438	1250	14.25	16.96	311	2.70
3.1.4.4 50 % of torque defined in 3.1.4.2						
30.9	2469	1266	11.36	13.52	368	2.29
3.1.4.5 25 % of torque defined in 3.1.4.2						
15.6	2492	1278	8.66	10.31	555	1.51
3.1.4.6 unloaded						
-	2568	1317	6.56	7.81	-	-

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						
65.4	1950	1000	17.76	21.14	272	3.09
3.1.5.2 85 % of torque obtained in 3.1.5.1						
56.8	1993	1022	15.12	18.00	266	3.16
3.1.5.3 75 % of torque defined in 3.1.5.2						
43.7	2044	1048	12.10	14.40	277	3.03
3.1.5.4 50 % of torque defined in 3.1.5.2						
29.6	2075	1064	9.40	11.19	318	2.65
3.1.5.5 25 % of torque defined in 3.1.5.2						
15.1	2126	1090	6.99	8.32	463	1.81
3.1.5.6 unloaded						
-	2215	1136	4.95	5.89	-	-

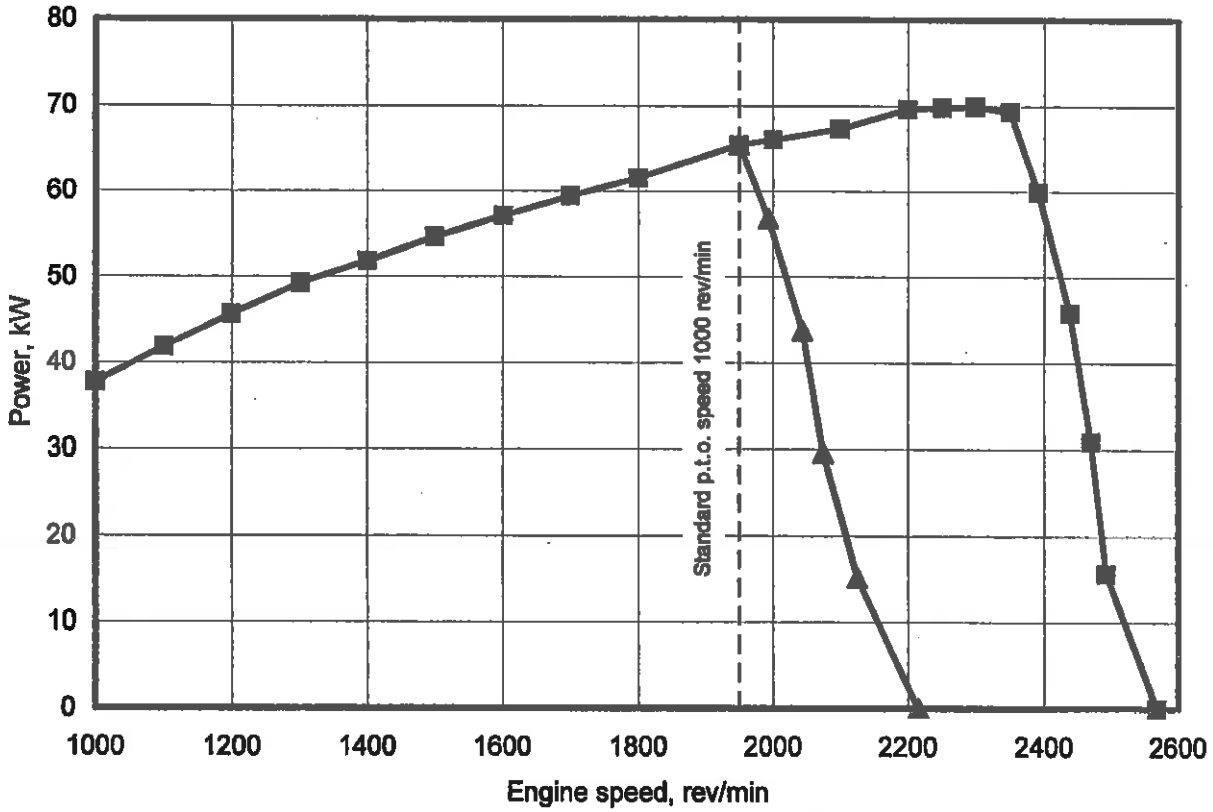
No load maximum engine speed: 2568 rev/min

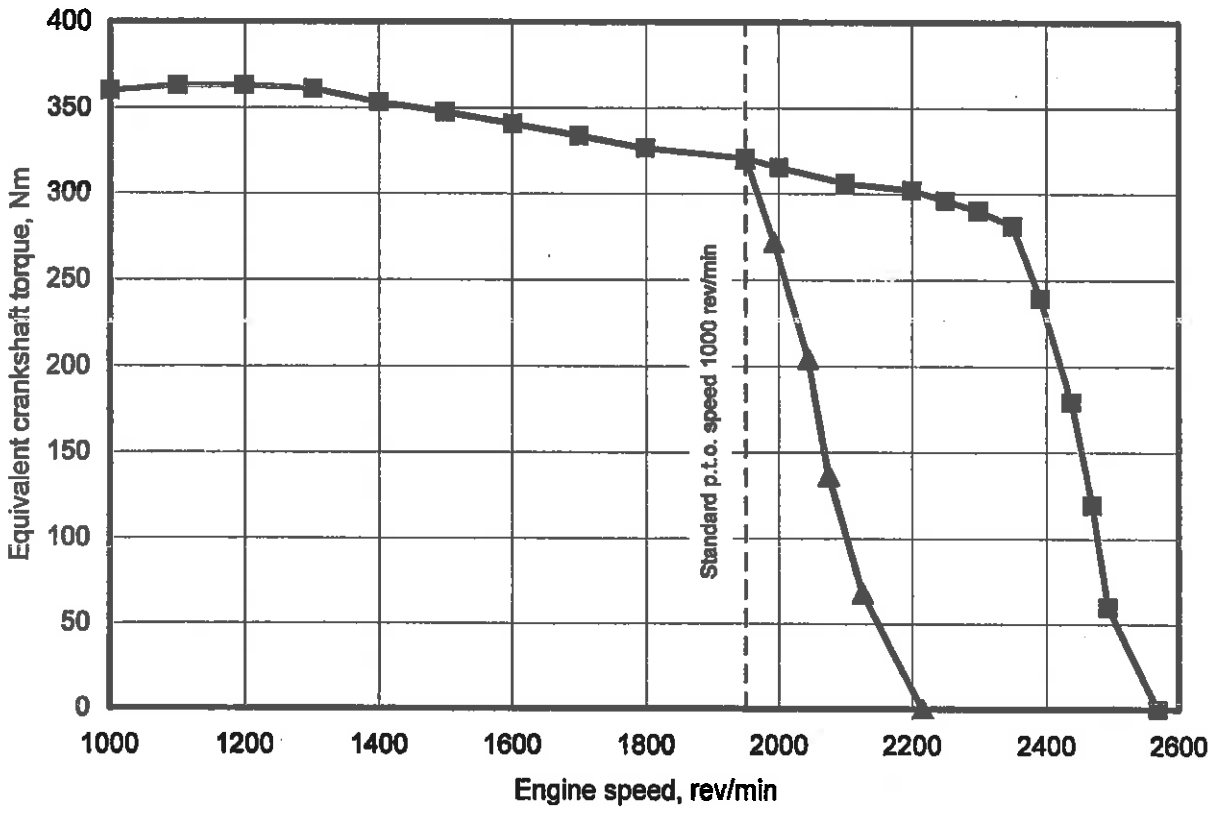
Torque (equivalent crankshaft)
At maximum power: 290.3 Nm
At rated engine speed: 281.6 Nm
At standard power take-off speed: 320.3 Nm

Maximum torque (equivalent crankshaft): 363.2 Nm
(engine speed: 1199 rev/min)

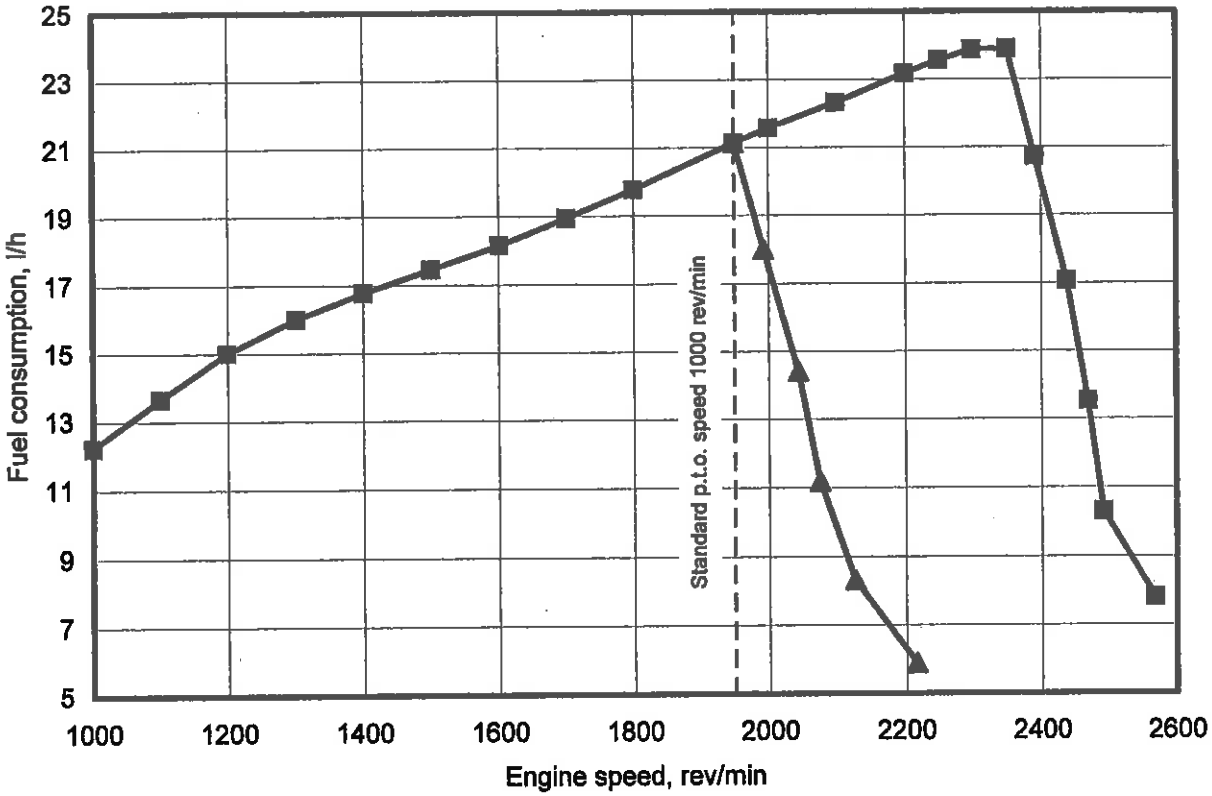
Mean atmospheric conditions:	
Temperature	21 °C
Pressure	96.5 kPa
Relative humidity	54 %
Maximum temperatures:	
Coolant	96 °C
Engine oil	121 °C
Fuel	44 °C
Engine air intake	35 °C

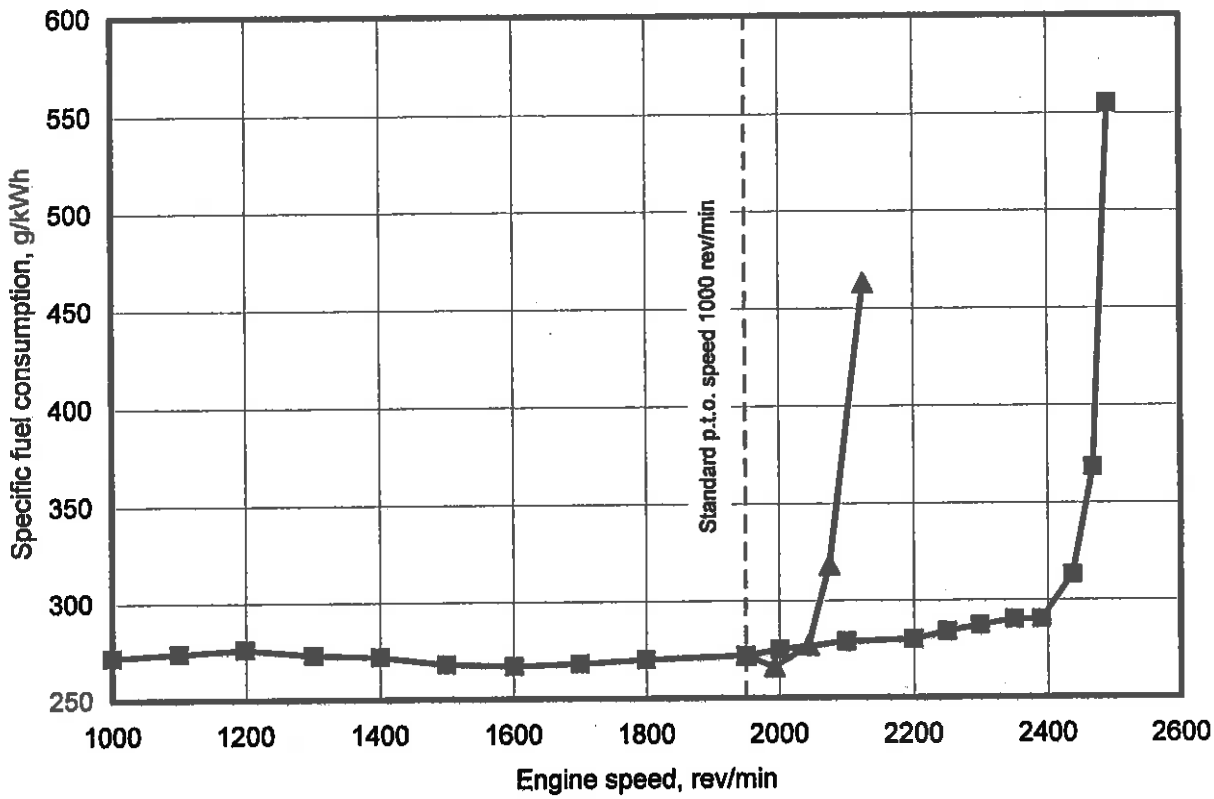
POWER TAKE-OFF TEST



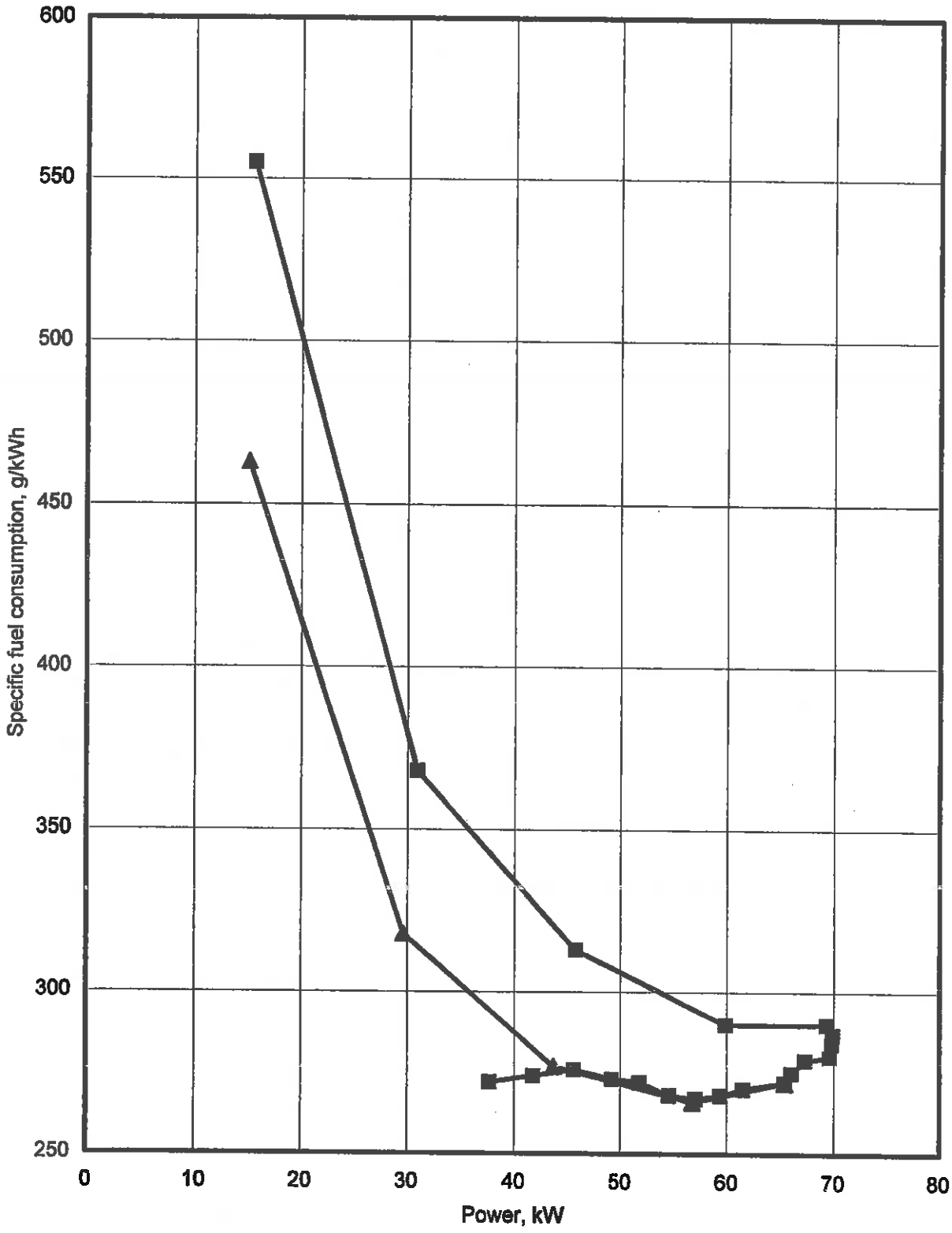


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 14th July and 4th November 1998

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 18.5 MPa

Pump stalled: Yes

Pump delivery rate at minimum pressure: 65.0 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	61.0	16.7	17.0
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	60.0	17.2	17.2

Tapping point used for test: External tapping

Temperature of hydraulic fluid: 67 °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 11

	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 with lifting force	711 mm 681 mm	927 mm 867 mm
Maximum corrected force exerted through full range	50.4 kN	36.7 kN
Corresponding pressure of hydraulic fluid	16.7 MPa	16.7 MPa
Moment about rear-wheel axis	55.7 kNm	62.9 kNm
Maximum tilt angle of mast from vertical	-	12 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm	-455	-400	-375	-300	-200	-100	0	+100	+200	+300	+306	+412
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	-	-	50.4	50.6	53.5	54.5	53.1	55.6	56.0	-	53.5	-
Corresponding pressure: 16.7 MPa												
Lifting forces at the test frame												
kN	38.7	40.6	-	41.9	42.0	43.2	42.8	41.1	40.6	39.3	-	36.7
Corresponding pressure: 16.7 MPa												

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 6th and 8th October 1998

Type of track: Bituminous-concrete surface

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
428	120	110

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	48.0	42.0	4.11	2397	15.2	364
3 Lo M	54.2	41.5	4.70	2373	15.1	367
3 Lo H	60.1	36.6	5.91	2350	7.0	336
4 Lo L	62.2	35.3	6.34	2348	6.6	325
4 Lo M	61.6	29.8	7.44	2353	5.5	329
1 Hi L	61.8	28.0	7.94	2345	5.2	327
4 Lo H	60.2	24.9	8.71	2353	4.5	335
1 Hi M	61.7	23.9	9.29	2349	4.3	326
1 Hi H	61.1	20.3	10.84	2349	3.5	326
2 Hi L	61.8	19.0	11.70	2354	3.3	324
2 Hi M	60.4	16.0	13.60	2354	2.9	331
2 Hi H	58.9	13.4	15.83	2356	2.3	341
3.3.2 FUEL CONSUMPTION 3.3.2.1 in selected gear, at maximum power at rated speed						
4 Lo L	62.2	35.3	6.34	2348	6.6	325
3.3.2.1.1 75 % of pull at maximum power at rated speed						
4 Lo L	49.0	26.5	6.65	2412	4.7	331
3.3.2.1.2 50 % of pull at maximum power at rated speed						
4 Lo L	33.8	17.7	6.88	2456	3.1	379
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1						
4 Lo M	49.0	26.5	6.65	2082	4.7	309
3.3.2.1.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2						
4 Lo M	33.9	17.7	6.90	2129	3.1	347
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed						
4 Lo M	61.6	29.8	7.44	2353	5.5	329
3.3.2.2.1 75 % of pull at maximum power at rated speed						
4 Lo M	48.3	22.4	7.76	2414	4.0	338
3.3.2.2.2 50 % of pull at maximum power at rated speed						
4 Lo M	33.2	14.9	8.02	2458	2.5	389
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 L	48.3	22.4	7.76	2265	4.0	320
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 L	33.2	14.9	8.02	2303	2.5	365

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2.31	31	87	98	8	96	97.5
2.29	30	90	99	7	97	97.5
2.50	28	91	101	7	95	97.5
2.59	29	91	102	8	96	97.5
2.55	28	91	101	8	95	97.5
2.57	29	91	101	12	70	97.5
2.51	30	92	102	13	69	97.5
2.58	31	92	102	13	70	97.5
2.57	33	92	103	13	70	97.5
2.59	31	92	101	13	72	97.5
2.54	32	93	103	13	72	97.5
2.47	32	93	102	13	71	97.5
2.59	29	91	102	8	96	97.5
2.54	35	90	102	12	75	97.5
2.22	40	90	103	12	75	97.5
2.72	29	87	96	12	76	97.5
2.42	30	87	94	12	76	97.5
2.55	28	91	101	8	95	97.5
2.48	36	89	101	13	72	97.5
2.16	39	90	102	13	72	97.5
2.62	30	88	99	13	74	97.5
2.30	33	86	96	13	74	97.5

4. OPTIONAL TESTS RESULTS

4.1 BRAKING

Date of tests: 18th to 21st August 1998

Tractor mass (with driver)

	Front	Rear	Total
	kg	kg	kg
Ballasted tractor	3000	5500	8500
Unballasted tractor	1805	2880	4685

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	38.4	105	0.88
		155	1.13
		195	1.52
		250	3.28
		315	3.95
		380	4.55
Unballasted tractor	38.6	100	0.53
		145	0.93
		195	1.56
		250	2.02
		300	3.69
		365	4.12

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

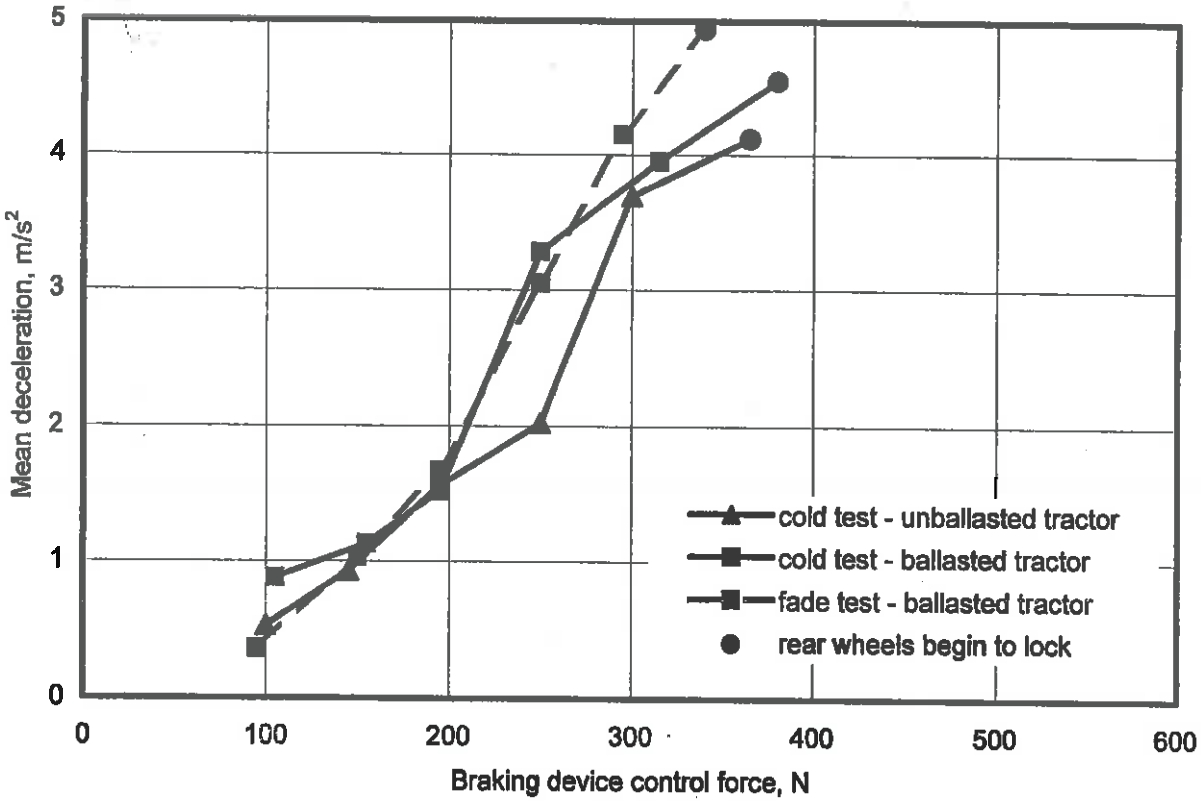
4.1.2 Fade test

	Speed before application of brakes	Braking device control force	Mean deceleration
	km/h	N	m/s²
Ballasted tractor	38.4	95	0.36
		150	1.03
		195	1.67
		250	3.05
		295	4.15
		340	4.94

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	225	220

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: 29.6 km/h

Sound level: 88.5 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:	29.6 km/h
Sound level:	87.5 dB(A)

5. REPAIRS

None

6. REMARKS

None

Test carried out by: Dipl. Ing. Peter Pernis

Head of the Tractor Laboratory

Peter Pernis

Dipl. Ing. Peter Pernis

Director

Dipl. Ing. Vladimír Hanzlík