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 № 2/1837

Date of approval: 28th July 1999



Agricultural Tractor

ZTS 16445 (4WD) 35 km/h version

with Emissions Compliant Engine

Manufactured by: ZTS TEES Martinské strojárne a.s.,
SK-036 57 Martin, Slovakia

Report № 14432

Date of test: October 1998 - June 1999

TABLE OF CONTENTS

1. SPECIFICATIONS OF TRACTOR 3
2. TEST CONDITIONS 14
3. COMPULSORY TESTS RESULTS 16
3.1 Main power take-off 16
3.2 Hydraulic power and lifting force 21
3.3 Drawbar power test (unballasted tractor) 22
4. OPTIONAL TESTS RESULTS 25
4.1 Braking 25
4.2 Measurement of external noise 26
5. REPAIRS 27
6. REMARKS 27

Tractor manufacturer's name and address:	ZTS TEES Martinské strojárne a.s., SK-036 57 Martin, Slovakia
Location of tractor assembly:	Martin, Slovakia
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer
Place of running-in:	Martin, Slovakia
Duration of running-in:	100 hours
Location of test:	SZZPLS Praha, Czech Republic

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

Make:	ZTS
Model:	16445 35 km/h version with Emissions Compliant Engine
Type:	Wheeled, unit construction, all wheels drive
Number of driving wheels:	4
Serial №:	16445 4187
1st Serial №:	16445 4187

1.2 ENGINE

Make:	MARTIN DIESEL
Model:	Z 8604.030
Type:	4-stroke diesel engine, direct injection, water cooled, turbocharged
Serial №:	H00775

1.2.1 Cylinders

Number/disposition:	6, in-line, vertical
Bore/stroke:	110 mm/128 mm
Capacity:	7299 cm³
Compression ratio:	17.5:1
Arrangement of valves:	Overhead
Cylinder liners:	Wet, replaceable

1.2.2 Supercharging

Make, model and type:	KKK, K27 or HOLSET, H1E, exhaust driven
Pressure:	135 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):	AUTOBRZDY, 443 741 429 000, two-stage with paper cartridge
Capacity of fuel tank:	199 dm³
Make, model and type of injection pump:	MOTORPAL, PP6M10P1iN12093.3, in-line
Serial №:	V8902
Manufacturer's production setting of injection pump	
Flow rate (rated engine speed and full load):	32.78 to 36.14 dm³/h
Timing:	9°+1° before TDC
Make, model and type of injectors:	MOTORPAL, VA 78P 450 N11319, 6 hole
Injection pressure:	30.0+0.8 MPa
Fuel cooler:	None

1.2.4 Governor

Make, model and type:	MOTORPAL, RV 3M 300 1100, centrifugal, variable speed with overpressure corrector
Governed range of engine speed:	From 600 to 2450 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, 91 075 or DONALDSON, FLG 12-0386, dry with paper primary and safety elements, integrated cyclon type pre-cleaner
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:	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:	25.0 dm³

Type of temperature control:	Thermostat
Superpressure system:	40+10 kPa

1.2.8 Starting system

Make, model and type:	AVF AUTOVILL, IM 693, electrical, solenoid engaged
Starter motor power rating:	6.6 kW
Cold starting aid:	None
Safety device:	Gear selector 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:	2
Rating:	100 Ah at 20 hours

1.2.10 Exhaust system

Make, model and type:	ZTS, Turbo Z IV, expansion and absorption muffler
Location:	Left-hand side of engine, vertical

1.3 TRANSMISSION

1.3.1 Clutch

Make, model and type:	TAZ, 89.021.500, dry plate for transmission only
Number of plates:	1
Diameter of plates:	380 mm
Method of operation:	Hydraulically by pedal

1.3.2 Gear box

Make, model and type:	POVAŽSKÉ STROJÁRNE, 90 961.8, mechanical
Description:	Synchromesh gear box with 4 speeds, group gear box with two speed ranges and reverse (I, II and R) and 2-speed hydraulically actuated torque multiplier (T and R)

	Forward	Reverse
Number of gears	4	4
Number of groups	2	1
Number of ranges	2	2
Total of arrangements	16	8

Available options:	None
Oil cooler:	Heat exchanger with air

1.3.3 Rear axle and final drives

Make, model and type: ZTS, ZM 130, crown wheel and bevel pinion differential and outboard planetary final drives

Differential lock

Type: Multi-plate wet clutch, electro-hydraulically actuated

Method of engagement: Rocker switch on the dashboard

Method of disengagement: Rocker switch on the dashboard

1.3.4 Front axle

Make, model and type: ZTS, 8R-N-UR4, crown wheel and bevel pinion differential and outboard planetary final drives

Differential lock

Type: Multi-plate wet clutch, electro-hydraulically actuated

Method of engagement: Rocker switch on the dashboard

Method of disengagement: Rocker switch on the dashboard

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 (*)
1	I	T	277.809	2.55
		R	231.507	3.06
2		T	176.265	4.02
		R	146.887	4.83
3		T	110.931	6.39
		R	92.442	7.67
4		T	83.864	8.46
		R	69.886	10.15
1	II	T	83.395	8.50
		R	**69.496**	**10.20**
2		T	52.913	13.40
		R	44.094	16.08
3		T	33.300	21.29
		R	27.750	25.55
4		T	25.175	28.17
		R	20.979	33.80
1	R	T	177.909	3.99
		R	148.257	4.78
2		T	112.880	6.28
		R	94.067	7.54
3		T	71.040	9.98
		R	59.200	11.98
4		T	**53.706**	**13.20**
		R	44.755	15.84
(*) Calculated with a tyre dynamic radius index of 855 mm (ISO 4251-1:1998)				

I: Low group, II: High group, R: Reverse, T: Turtle range, R: Rabbit range

Number of revolutions of front wheels for one revolution of rear-wheels: 1.4038

1.4 POWER TAKE-OFF

1.4.1 Main power take-off

Type: Independent

Method of engagement: Hydraulically actuated multi-plate wet clutch operated by hand lever, independent of main drive clutch

Number of shafts: 1

Method of changing power take-off shaft ends and speeds: Manually by exchanging shafts

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
1000	44.5	20	Yes

Height above ground: 719 mm

Distance from the median plane of the tractor: 0 mm

Distance behind rear-wheel axis: 530 mm for power take-off types 1 and 2
535 mm for power take-off type 3

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	1890	3.5000	45.0/795.8 Nm
	629	2200		
1000	1000	1920	1.9200	None
	1146	2200		

Direction of rotation (viewed from behind tractor): Clockwise

1.4.1.2 Power take-off proportional to ground speed

Indicate	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 or 1000	0.177	30.3516

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

1.4.2 Optional power take-off

Type: Independent

Method of engagement: Hydraulically actuated multi-plate wet clutch operated by hand lever, 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: 621 mm

Distance from the median plane of the tractor: 0 mm

Distance in front front-wheel axis: 768 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	1947	1.9474	40.0/382.0
	1130	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

1.5.1 Rear power lift

Make, model and type: AGROMET ARCHIMEDES, 88 645, hydraulic with mechanical position, draft or mixed control, lower link sensing

Type of hydraulic system: Open centre

Type and number of cylinders: 1 integral single-acting and 2 external single-acting

Type of linkage lock for transport: Hydraulic

Relief valve pressure setting (tolerance): 18.0+2.0 MPa

Opening pressure of cylinder safety valve: 20.5+1.0 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

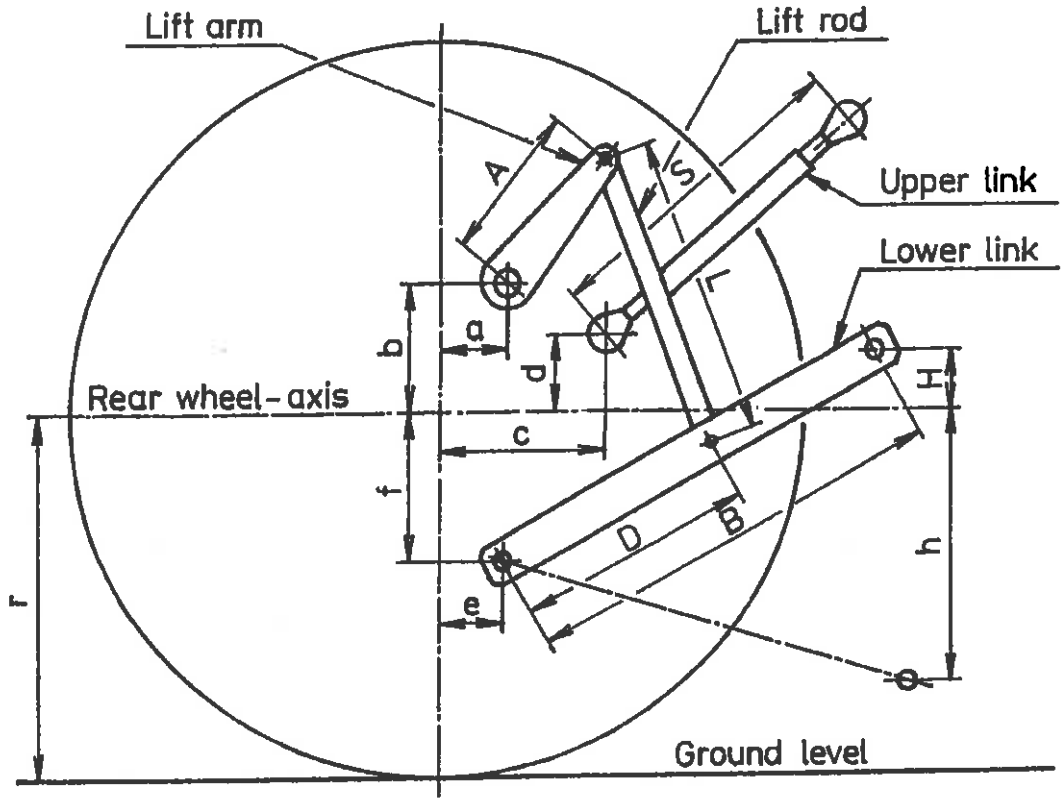
Site of oil reservoir: Transmission housing

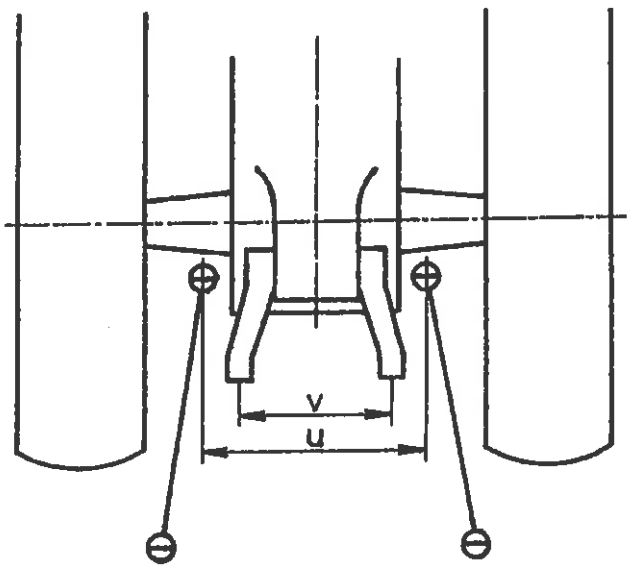
Type, number and location of tapping points: ISO standard couplings 12.5 mm, 2 double acting control valves, 5 pressure (1 for cooperation with power lift) and 1 return couplings at rear of tractor

Maximum volume of oil available to external cylinders:	15 dm³

1.6 THREE-POINT LINKAGE

Category:	3, 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)	994	994
Distance of lift arm pivot point from rear-wheel axis:	horizontally	(a)	170	170
	vertically	(b)	285	285
Horizontal distance between the 2 lower link points		(u)	542	542
Horizontal distance between the 2 lift arm end points		(v)	640	640
Length of upper link		(S)	659 to 880	769
Distance of upper link pivot point from rear-wheel axis:	horizontally	(c)	385	385
	vertically	(d)	123, 170, 210	210
Distance of lower link pivot point from rear-wheel axis:	horizontally	(e)	130	130
	vertically	(f)	255	255
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	501	501
Length of lift rods		(L)	516 to 652	575
Height of lower hitch points relative to the rear-wheel axis:				
	in low position	(h)	506 to 692	625
	in high position	(H)	61 to 205	123
Height above ground of lower hitch points when locked in transport position (*)			Any height withing lift range	
(*) Assuming r=855 mm tyre dynamic radius index of ISO 4251-1:1998				

1.7 SWINGING DRAWBAR

Type: Clevis

Height above ground
Maximum: 439 mm
Minimum: 439 mm

Type of adjustment: Sliding drawbar in two distance of hitch point from power take-off shaft end – 400 and 500 mm

Distance of hitch point from rear-wheel axis, horizontally: 930 and 1030 mm

Distance of hitch point from power take-off shaft end
Vertically: 280 mm
Horizontally: 400 and 500 mm for power take-off types 1 and 2
395 and 495 mm for power take-off type 3

Lateral adjustment (centre of clevis)
Right-hand: 0 mm
Left-hand: 0 mm

Distance of pivot point from rear-wheel axis, horizontally: 385 mm to rear

Diameter of drawbar pin hole: 33 mm

Maximum vertical permissible load:	9 kN for setting 400 mm 7 kN for setting 500 mm

1.8 TRAILER HITCH

Type:	Automatic clevis
Hole diameter:	40 mm
Height above ground:	758, 808, 858, 908 and 958 mm
Distance of hitch point from rear-wheel axis, horizontally:	930 mm
Distance of hitch point from power take-off shaft end	
Vertically:	39, 89, 139, 189 and 239 mm
Horizontally:	400 mm for power take-off types 1 and 2 395 mm for power take-off type 3
Maximum vertical permissible load:	10 kN

1.9 HOLED DRAWBAR

Number of holes:	9
Distance between holes:	80 mm
Hole diameter:	32 mm
Thickness/width of the drawbar:	2×20 mm/100 mm
Height above ground	
Maximum:	978 mm
Minimum:	230 mm
Horizontal distance to power take-off shaft end (rear):	594 mm for power take-off types 1 and 2 589 mm for power take-off type 3

1.10 SEMI-TRAILER HITCH

Type:	Towing hook
Hole diameter:	47 mm
Height above ground:	489 mm
Distance of hitch point from rear-wheel axis, horizontally:	709 mm
Distance of hitch point from power take-off shaft end	
Vertically:	230 mm
Horizontally:	179 mm for power take-off types 1 and 2 174 mm for power take-off type 3
Maximum vertical permissible load:	21 kN

1.11 FRONT TOWING HITCH

None

1.12 STEERING

Make, model and type:	REXROTH HYDRAULICS, LAGC 125, 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:	9.0 MPa

1.13 BRAKES

1.13.1 Service brake

Make, model and type:	ZTS, 63.227.000, wet disc, multi-plate, 4 discs on each side
Method of operation:	Hydraulically by pedals, independent on rear wheels or coupled pedal giving compensated actuation and automatic engagement of four wheel drive providing four-wheel braking
Trailer braking take-off:	Combined one line and two line air 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:	2734 mm

Track width adjustment:

	Minimum	Maximum	Adjustment method
	mm	mm	
Front	1835	2035	Reversing wheels
Rear	1800	1800	None

1.15 PROTECTIVE STRUCTURE

Make, model and type:	KOVOTREND, BK UR II M87, cab with integrated safety frame
Manufacturer's name and address:	KOVOTREND v.d., SK-065 43 Orlov, Slovakia
Protective device	
Cab/frame/rollguard/other:	Cab
Tiltable/not tiltable:	Not tiltable

O.E.C.D. approval

Approval number:	4/0 275/1
Date of approval:	31st May 1999
Nos. of minor modification certificates, if any:	None

1.16 SEAT

1.16.1 Driver's seat

Make, model and type:	GRAMMER, LS 95H1/90AR, upholstered seat with back rest and arm rests
Seat and steering wheel reversible:	No
Type of suspension:	Pneumatic with automatic adjustable for driver's weight
Type of damping:	Hydraulic
Range of adjustment	
Longitudinally:	160 mm
Vertically:	125 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
AGROMET	SA 56A	Mechanic	Hydraulic	150	80
GRAMMER	MSG 95A/20	Pneumatic	Hydraulic	150	80
MARS	Zetor 5911-5400	Mechanic	Hydraulic	150	60
SEARS	AS 2000	Pneumatic	Hydraulic	150	75
SEAT	TOP 565	Pneumatic	Hydraulic	160	90

Type:	Upholstered seat with back rest and arm rests
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	1260	145×80	230
Sidelights	1790	65×65	785
Rearlights	1835	95×70	855
Reflectors	1655	∅78	1060

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
4650	2395	2475	2785	2890

2.2 GROUND CLEARANCE (unballasted tractor): 365 mm

Clearance-limiting part: Swinging drawbar

2.3 TRACTOR MASS (unballasted tractor with cab)

	Without driver	With driver
	kg	kg
Front	2110	2125
Rear	3485	3545
Total	5595	5670

2.4 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
Make	BARUM	BARUM
Model	TZ 19	TZR 2
Dimensions	14.9-28	20.8 R 38
Ply rating	8 PR	153 A8
Type	Diagonal	Radial
Maximum load (tyre manufacturer's)	16.92 kN	37.59 kN
Maximum load (tractor manufacturer's)	18.00 kN	32.00 kN
Inflation pressure (tyre manufacturer's)	180 kPa	160 kPa
Dynamic radius index	640 mm	855 mm
Chosen track width:	1835 mm	1800 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
0.835 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	19.0	200	200
Gear box	52.0	1200	600
Front axle	2.6	2400	-
Rear axle		Common with gear box	
Final drive (front)	2×1.3	2400	-
Final drive (rear)	2×4.0	1200	-
Hydraulic system		Common with gear box	
Steering	8.0	1200	1200

2.6.2 Specifications

	Recommended	Used during test
Engine oil:		
Type	SAE 15W-40	As recommended
Viscosity	14.0 cSt at 100 °C	
Classification	API SG/CE	
Transmission oils:		
Type	SAE 80W	As recommended
Viscosity	7.5 cSt at 100 °C	
Classification	API GL-4	
Steering oil:		
Type	OL-N22	As recommended
Viscosity	19.8 cSt at 40 °C	
Classification	ISO 6743-L-HH22	

Hydraulic fluid: Same as transmission

2.6.3 Grease

Number of lubrication points: 31

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 21st October 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						
111.8	2200	1146	29.56	35.19	264	3.18
3.1.2 POWER AT RATED ENGINE SPEED						
111.8	2200	1146	29.56	35.19	264	3.18
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
103.3	1920	1000	25.20	30.00	244	3.44
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
111.8	2200	1146	29.56	35.19	264	3.18
3.1.4.2 85 % of torque obtained in 3.1.4.1						
99.1	2294	1195	27.36	32.57	276	3.04
3.1.4.3 75 % of torque defined in 3.1.4.2						
75.5	2329	1213	22.06	26.26	292	2.88
3.1.4.4 50 % of torque defined in 3.1.4.2						
51.1	2365	1232	16.84	20.05	330	2.55
3.1.4.5 25 % of torque defined in 3.1.4.2						
26.0	2408	1254	11.99	14.27	461	1.82
3.1.4.6 unloaded						
-	2448	1275	7.28	8.67	-	-

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						
103.3	1920	1000	25.20	30.00	244	3.44
3.1.5.2 85 % of torque obtained in 3.1.5.1						
96.9	2120	1104	25.06	29.83	259	3.25
3.1.5.3 75 % of torque defined in 3.1.5.2						
74.0	2158	1124	20.09	23.92	271	3.09
3.1.5.4 50 % of torque defined in 3.1.5.2						
50.2	2195	1143	15.30	18.21	305	2.76
3.1.5.5 25 % of torque defined in 3.1.5.2						
25.6	2237	1165	10.71	12.75	418	2.01
3.1.5.6 unloaded						
-	2275	1185	6.26	7.45	-	-

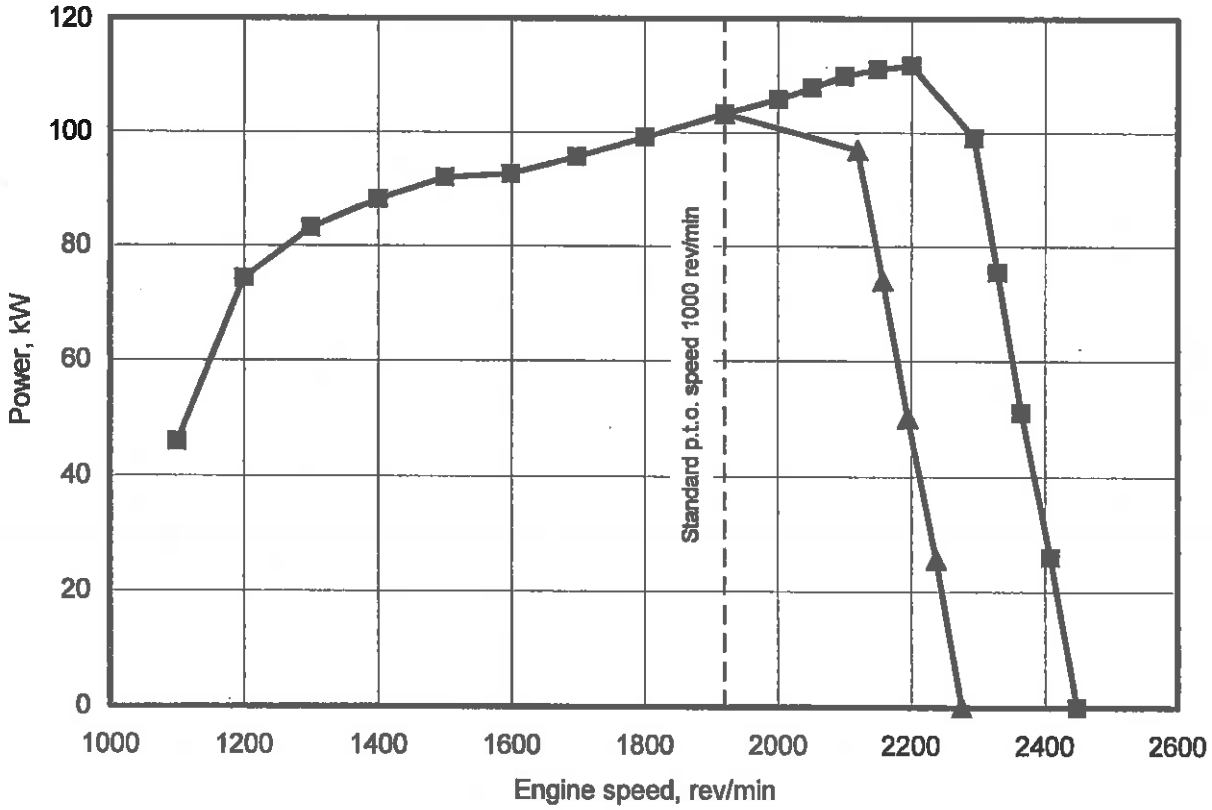
No load maximum engine speed: 2448 rev/min

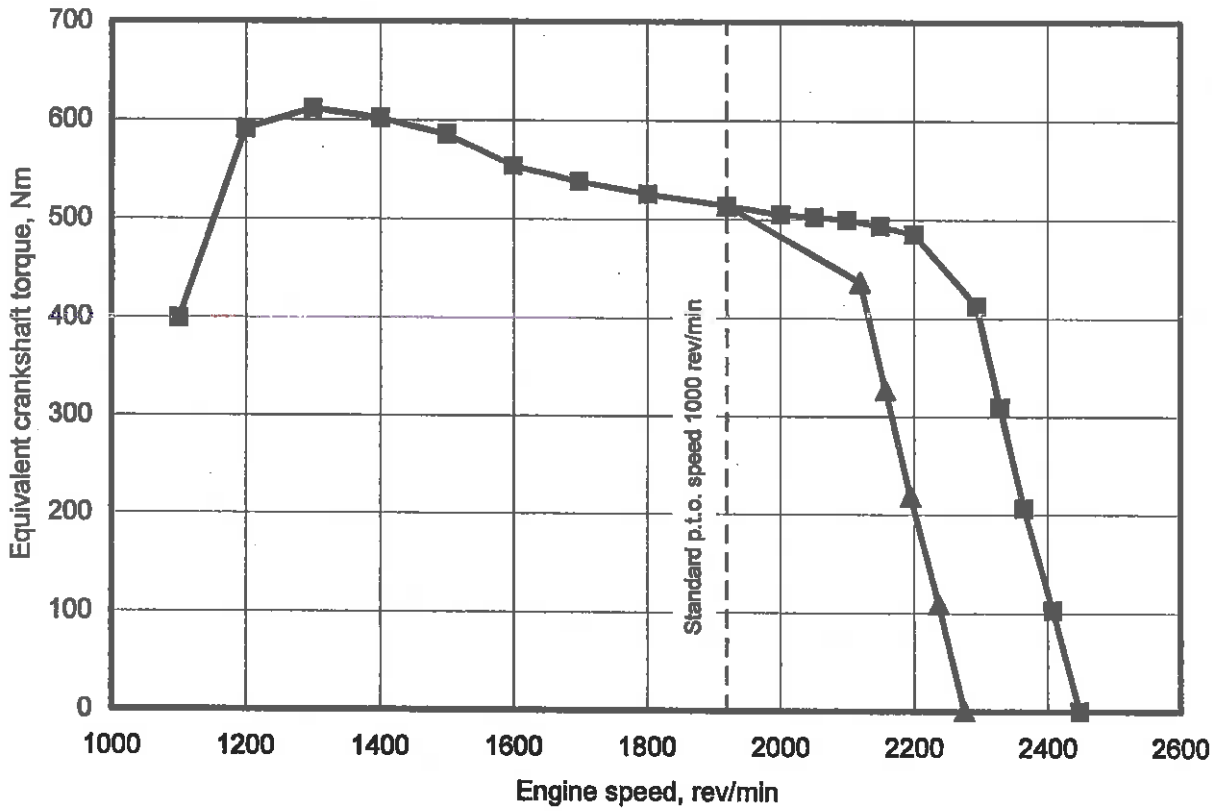
Torque (equivalent crankshaft)
At maximum power: 485.3 Nm
At rated engine speed: 485.3 Nm
At standard power take-off speed: 513.8 Nm

Maximum torque (equivalent crankshaft): 611.2 Nm
(engine speed: 1300 rev/min)

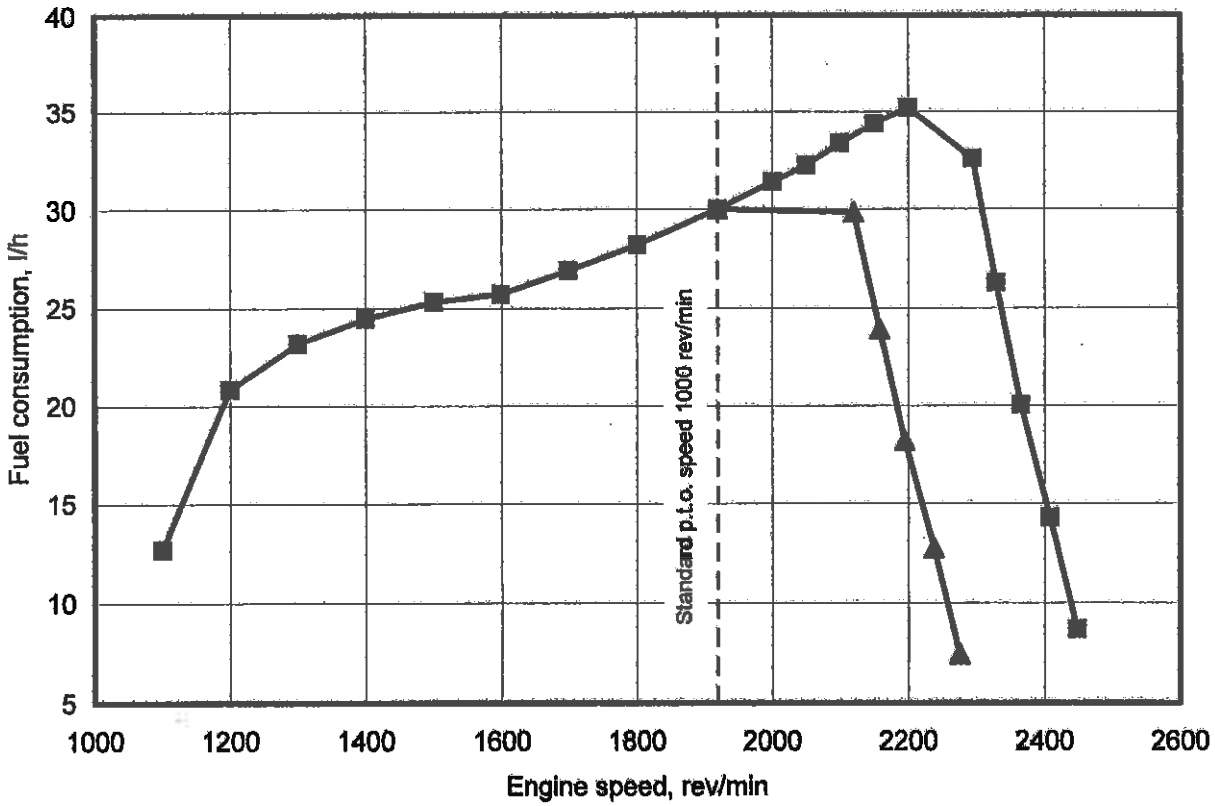
Mean atmospheric conditions:	
Temperature	26 °C
Pressure	97.7 kPa
Relative humidity	30 %
Maximum temperatures:	
Coolant	101 °C
Engine oil	118 °C
Fuel	58 °C
Engine air intake	36 °C

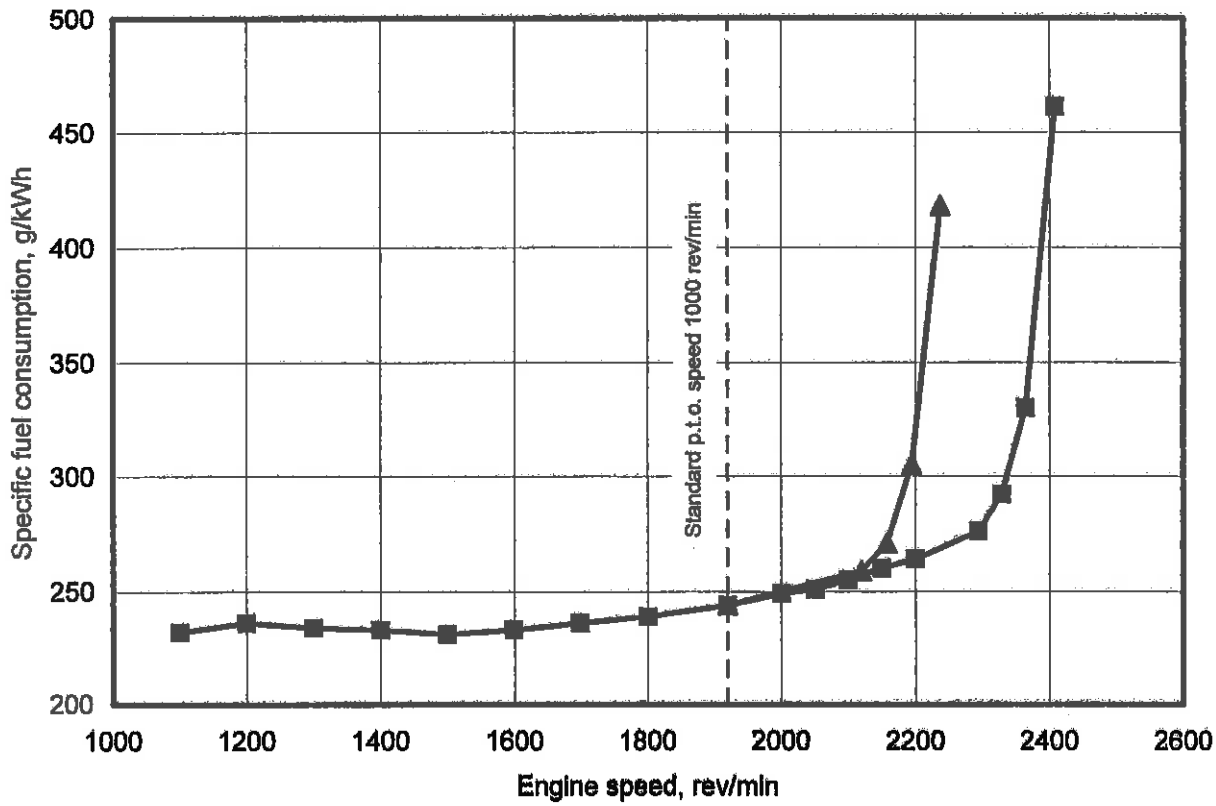
POWER TAKE-OFF TEST



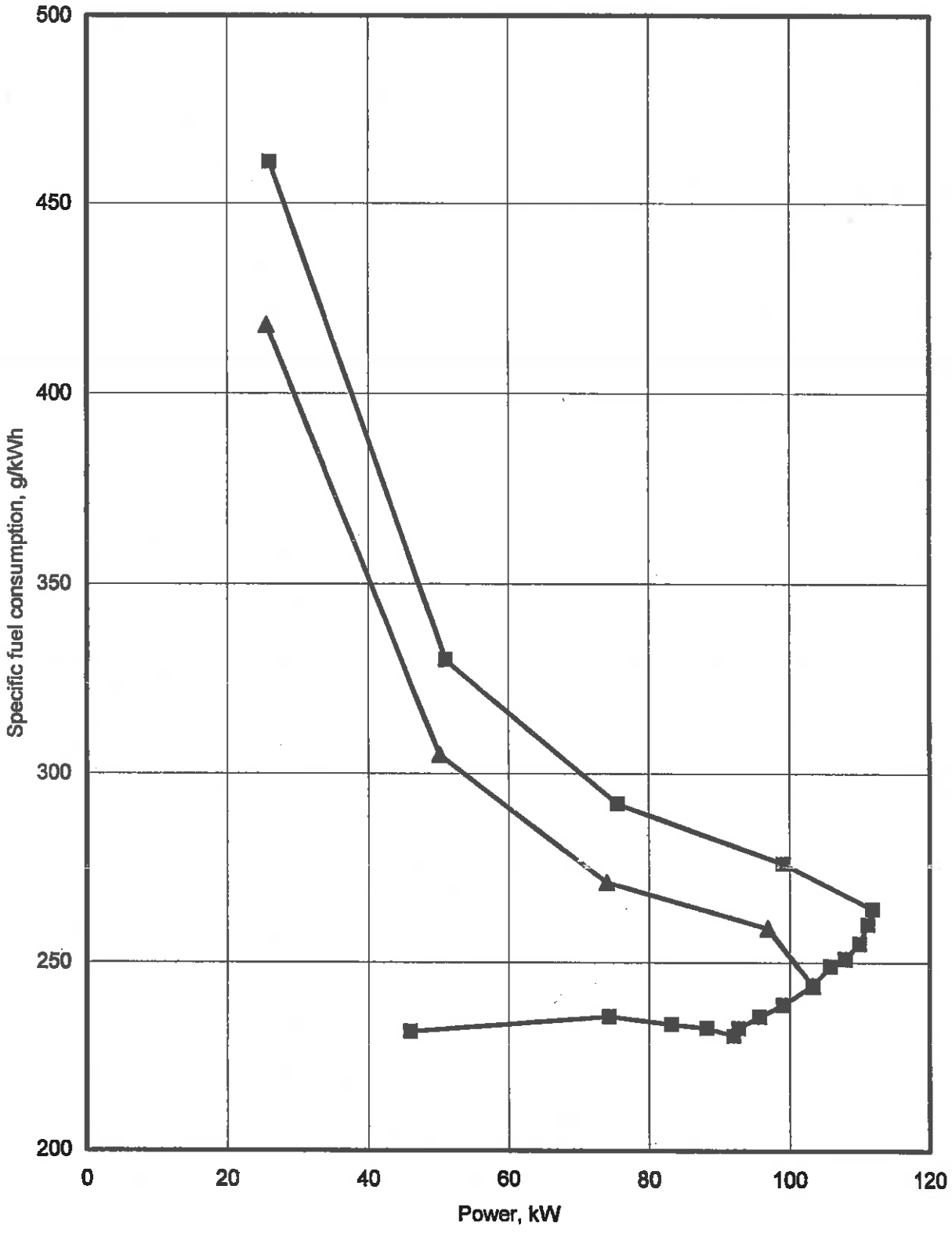


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 23rd and 24th November 1998

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 19.1 MPa

Pump stalled: Yes

Pump delivery rate at minimum pressure: 48.0 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	26.0	17.2	7.5
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	44.0	15.3	11.2

Tapping point used for test: External tapping

Temperature of hydraulic fluid: 64 °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 10

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	230 mm	230 mm
Vertical movement: without lifting force	748 mm	945 mm
with lifting force	707 mm	876 mm
Maximum corrected force exerted through full range	57.8 kN	39.5 kN
Corresponding pressure of hydraulic fluid	17.2 MPa	17.2 MPa
Moment about rear-wheel axis	60.2 kNm	65.3 kNm
Maximum tilt angle of mast from vertical	-	13 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points													
mm	-440	-400	-370	-300	-200	-100	0	+100	+200	+300	+337	+400	+436
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	-	-	60.5	61.5	61.6	61.1	60.5	59.9	58.7	57.8	58.2	-	-
Corresponding pressure: 17.2 MPa													
Lifting forces at the test frame													
kN	52.6	52.6	-	52.7	51.7	49.9	48.2	46.4	44.4	42.4	-	40.1	39.5
Corresponding pressure: 17.2 MPa													

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 23rd June 1999

Type of track: Bituminous-concrete surface

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
439	170	130

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)						
2 I T	52.7	49.9	3.80	2350	15.0	394
2 I R	63.2	50.2	4.53	2331	15.1	373
3 I T	82.0	50.1	5.89	2289	15.1	351
3 I R	92.2	47.3	7.02	2199	12.2	326
4 I T	93.1	42.0	7.98	2191	9.2	322
1 II T	94.1	42.1	8.05	2205	9.4	316
4 I R	94.0	34.3	9.87	2195	6.5	317
1 II R	94.7	34.3	9.94	2200	6.6	312
2 II T	94.8	25.8	13.23	2190	4.9	314
2 II R	92.5	20.7	16.09	2197	3.9	319
3.3.2 FUEL CONSUMPTION 3.3.2.1 in selected gear, at maximum power at rated speed						
2 II T	94.8	25.8	13.23	2190	4.9	314
3.3.2.1.1 75 % of pull at maximum power at rated speed						
2 II T	75.7	19.4	14.05	2305	3.8	342
3.3.2.1.2 50 % of pull at maximum power at rated speed						
2 II T	52.1	12.9	14.54	2345	2.5	392
3.3.2.1.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.1						
2 II R	75.6	19.4	14.02	1906	3.8	294
3.3.2.1.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.1.2						
2 II R	52.2	12.9	14.56	1959	2.5	329
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed						
3 I R	92.2	47.3	7.02	2199	12.2	326
3.3.2.2.1 75 % of pull at maximum power at rated speed						
3 I R	76.9	35.5	7.80	2305	7.0	339
3.3.2.2.2 50 % of pull at maximum power at rated speed						
3 I R	53.8	23.7	8.17	2348	4.5	371
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1						
4 I T	76.8	35.4	7.81	2096	6.9	318
3.3.2.2.4 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.2						
4 I T	54.1	23.8	8.19	2142	4.6	346

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2.12	38	84	98	14	68	97.5
2.24	37	84	100	14	67	97.5
2.38	44	87	102	15	67	97.5
2.56	40	85	97	15	67	97.5
2.60	40	82	102	16	64	97.5
2.64	41	81	96	16	63	97.5
2.64	39	81	101	17	60	97.5
2.68	44	82	103	17	60	97.5
2.66	36	82	93	17	56	97.5
2.62	43	87	100	17	56	97.5
2.66	36	82	93	17	56	97.5
2.44	42	85	100	17	56	97.5
2.13	43	80	103	17	56	97.5
2.84	42	82	97	19	55	97.5
2.54	41	79	97	19	55	97.5
2.56	40	85	97	15	67	97.5
2.46	45	82	96	17	56	97.5
2.25	43	81	98	17	56	97.5
2.63	39	80	98	18	56	97.5
2.41	38	79	98	18	56	97.5

4. OPTIONAL TESTS RESULTS

4.1 BRAKING

Date of tests: 5th January and 1st March 1999

Tractor mass (with driver)

	Front	Rear	Total
	kg	kg	kg
Ballasted tractor	3600	6400	10000
Unballasted tractor	2125	3545	5670

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	37.0	125	0.62
		205	0.89
		300	1.55
		375	1.83
		495	2.24
		600	3.36
Unballasted tractor	37.9	105	0.71
		195	1.38
		305	2.26
		385	3.02
		490	3.65
		510	4.32

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

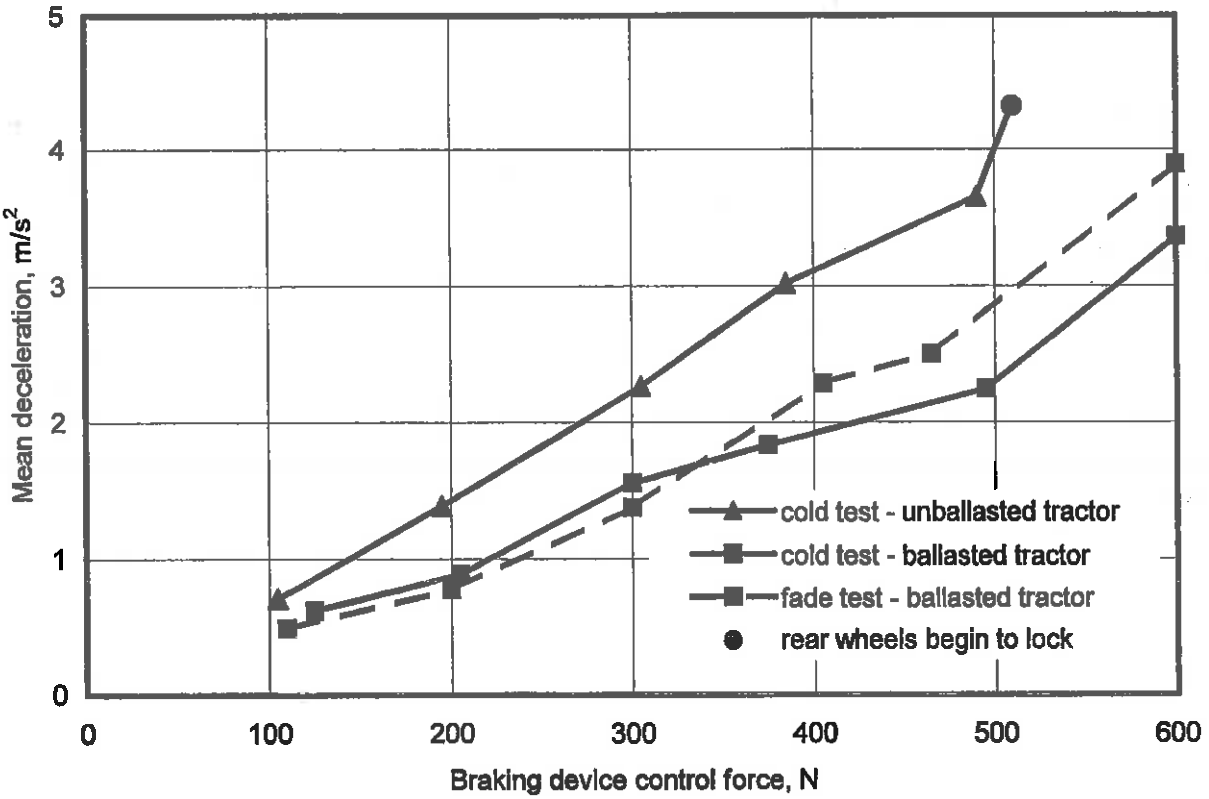
4.1.2 Fade test

	Speed before application of brakes	Braking device control force	Mean deceleration
	km/h	N	m/s²
Ballasted tractor	37.0	110	0.49
		200	0.78
		300	1.37
		405	2.28
		465	2.50
		600	3.89

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	395	400

4.2 MEASUREMENT OF EXTERNAL NOISE

Date of tests: 2nd December 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 II R

Travelling speed before acceleration: 28.9 km/h

Sound level: 89.0 dB(A)

4.2.2 According to EEC directives 74/151/EEC (Annex VI), 88/410/EEC and 97/54/EC

Gear number:	4 II R
Travelling speed before acceleration:,	28.9 km/h
Sound level:	88.0 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