STÁTNÍ ZKUŠEBNA ZEMĚDĚLSKÝCH, POTRAVINÁŘSKÝCH A LESNICKÝCH STROJŮ

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Extension of validity of a test made 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 № 2/1774/1

Date of approval: 4th October 2002



Agricultural Tractor

ZETOR 10641 Forterra (4WD) 40 km/h version

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

Report № 22668

Date of test: August 2002

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GENERAL NOTE

SZZPLS Praha is still the official Czech Republic Test Station for carrying out Tests in accordance with the OECD Standard Codes for the Official Testing of Agricultural and Forestry Tractors.

Checking for the extension test report

Location:	SZZPLS Praha, Czech Republic
Date of checking:	9th August 2002

This extension of validity for an original test has been approved by the OECD Co-ordinating Centre in Antony (France), as being in accordance with OECD Standard Code for the Official Testing of Agricultural and Forestry Tractors – Code 2.

OECD approval number:	2/1774/1
Date of approval:	4th October 2002

ORIGINAL TEST REPORT

The specifications of the tractor and the results of the performance test are taken from the report number:

OECD approval number:	2/1774
Date of approval:	24th August 1998
Make, model and type of tractor:	ZETOR, 10641 Forterra turbo 40 km/h version, 4WD
Manufactured by:	ZETOR a.s., CZ-632 00 Brno, Czech Republic
Submitted for test by:	The manufacturer

The differences between the tractors ZETOR 10641 Forterra turbo (4WD) 40 km/h version and ZETOR 10641 Forterra (4WD) 40 km/h version are written in *italics*, taking into account these differences, SZZPLS Praha has reproduced the main power take-off test and measurement of external noise and considers that the other results of reference test are valid for the tractor for which the extension is asked.

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 of the tractor:	ZETOR
Model (trade name):	10641 Forterra turbo 40 km/h version *10641 Forterra 40 km/h version*
Type:	4WD

1.1.1 Numbers

1st Serial № or prototype:	001 001 *R1064101001B*
Serial №:	001 001 *K1064103013C*

1.1.2 Other specifications

Model denomination(s) for other countries:	None
Transmission type or gears × groups × ranges:	4 × 2 × 3
Speed version:	40 km/h
Manufacturer identification of technical type number:	None

1.2 ENGINE

Make:	ZETOR
Model:	1303
Type:	4-stroke diesel engine, direct injection, water cooled, turbocharged with intercooler
Serial №:	*1303-001001* **1303-001514**

1.2.1 Cylinders

Number/disposition:	4, in-line, vertical
Bore/stroke:	105 mm/120 mm
Capacity:	4156 cm³
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 with intercooler
Pressure:	234 kPa
Inercooler:	Charge air heat exchanger with engine coolant cooled in additional radiator

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, PP4M10P1f3461, in-line *MOTORPAL, 4M 3461, in-line*
Serial №:	Not given *LH 0008*
Manufacturer's production setting of injection pump	
Flow rate (rated engine speed and full load):	21.75 to 22.24 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
Fuel cooler:	None

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, integrated cyclon type pre-cleaner *MEVA, Mefil 18, 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:	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 dm^3
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 *Starting operable only when clutch pedal fully depressed and p.t.o. switch in off 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 *165 Ah at 20 hours*

1.2.10 Exhaust system

Make, model and type:	ZETOR, 10.014.000, expansion and absorption muffler *ZETOR, 15.000.0114, expansion and absorption muffler*
Location:	Left-hand side of engine, vertical *Horizontal muffler under bonnet with vertical pipe near right front corner of cab*

1.3 TRANSMISSION

1.3.1 Clutch (travel and power take-off/travel alone)

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
Limited slip

Method of engagement: Rocker switch on the dashboard
Self-engaging

Method of disengagement: Service brake pedal
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	366.550	1.86
		M	316.639	2.15
		H	273.859	2.48
2		L	254.655	2.67
		M	219.981	3.09
		H	190.260	3.57
3		L	156.748	4.34
		M	135.405	5.02
		H	117.111	5.81
4		L	109.496	6.21
		M	94.586	7.19
		H	81.807	8.31
1	Hi	L	88.657	7.67
		M	76.585	8.88
		H	66.238	10.27
2		L	61.594	11.04
		M	53.207	12.78
		H	46.018	14.78
3		L	37.913	17.94
		M	32.750	20.77
		H	28.326	24.01
4		L	26.484	25.68
		M	22.878	29.73
		H	19.787	34.37
(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251-1:1998)				

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

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	317.016	2.15
		M	273.850	2.48
		H	236.851	2.87
2		L	220.243	3.09
		M	190.254	3.57
		H	164.549	4.13
3		L	135.566	5.02
		M	117.107	5.81
		H	101.285	6.71
1	Hi	L	76.677	8.87
		M	66.236	10.27
		H	57.287	11.87
2		L	53.270	12.77
		M	46.017	14.78
		H	39.799	17.09
3		L	32.789	20.74
		M	28.325	24.01
		H	24.498	27.76
(*) Calculated with a tyre dynamic radius index of 820 mm (ISO 4251-1:1998)				

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	53.0/937.2
	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	0.196	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 multi-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** mm	Number of splines	In conformity with ISO 8759-1:1998
1000	34.9	21	Yes

Height above ground: 729 mm
709 mm

Distance from the median plane of the tractor: 0 mm

Distance in front front-wheel axis: 664 mm
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	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 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

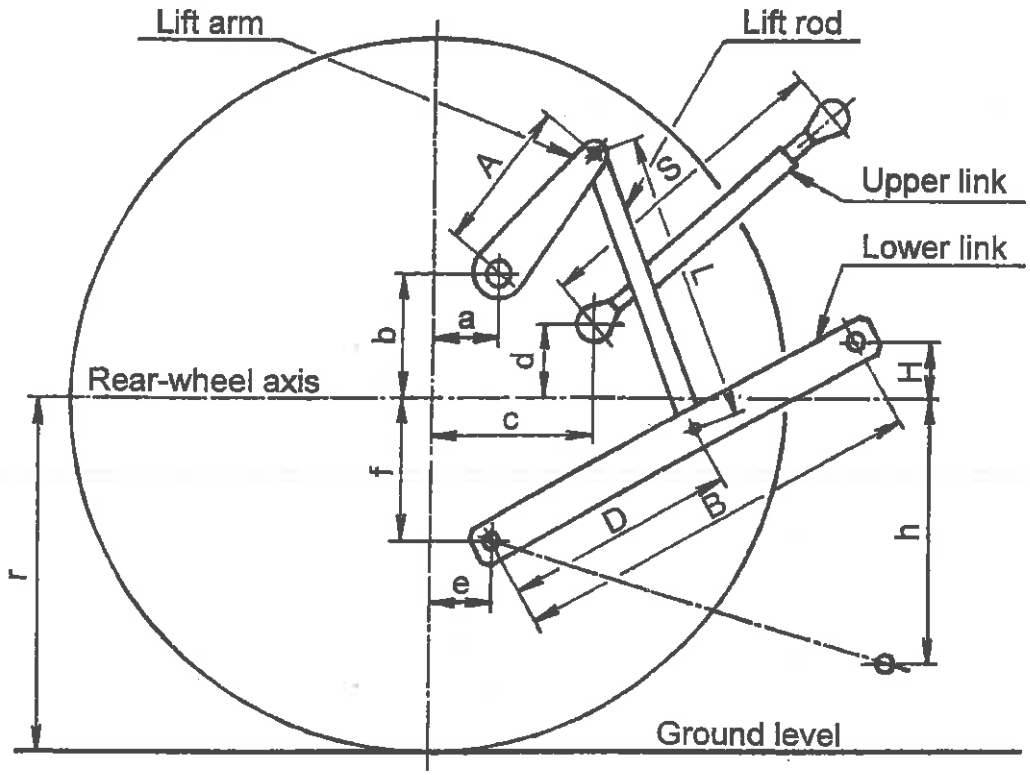
Type, number and location of tapping points: ISO standard couplings 12.5 mm, 3 double acting control valves, 6 pressure and 1 return couplings at rear of tractor

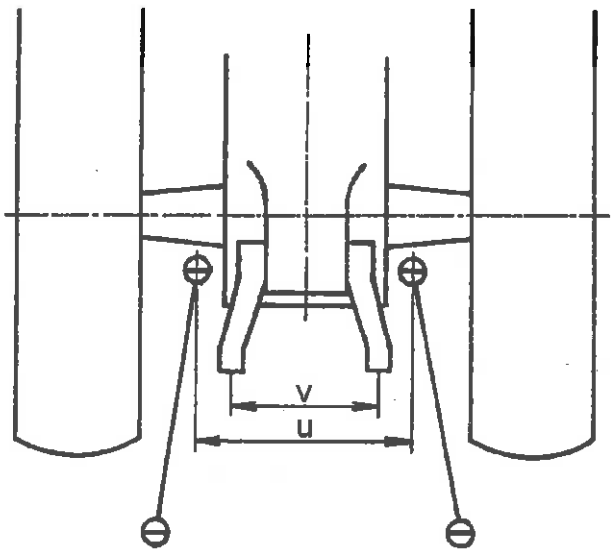
Maximum volume of oil available to external cylinders: 20 dm^3

1.6 THREE-POINT LINKAGE

Category: 2, in conformity with ISO 730-1:1994 + Cor.1:1995

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)	645 to 875	709
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)	500	500
Length of lift rods		(L)	585 to 715	665
Height of lower hitch points relative to the rear-wheel axis:				
	in low position	(h)	475 to 745	620
	in high position	(H)	-65 to 205	62
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 4251-1:1998				

1.7 SWINGING DRAWBAR

Type: Clevis

Height above ground
Maximum: 374 mm
428 mm

Minimum: 264 mm
428 mm

Type of adjustment: Inverting clevis and sliding drawbar
None

Distance of hitch point from rear-wheel axis, horizontally: 830 and 880 mm
879 mm

Distance of hitch point from power take-off shaft end
Vertically: 321 and 431 mm
267 mm

Horizontally: 350 and 400 mm
399 mm

Lateral adjustment (centre of clevis)
Right-hand: 80 and 160 mm
80 mm

Left-hand: 80 and 160 mm
80 mm

Distance of pivot point from rear-wheel axis, horizontally:	280 mm to front *201 mm to rear*
Diameter of drawbar pin hole:	31 mm
Maximum vertical permissible load:	12 kN for maximum high and 8 kN for minimum high *12 kN*

1.8 TRAILER HITCH

Type:	Automatic clevis
Hole diameter:	35 mm
Height above ground:	710, 810 and 910 mm *720, 820 and 920 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 *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:	882 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:	*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:	*18 kN*

1.11 FRONT TOWING HITCH

Height above ground:	900 mm *872 mm*
Diameter of pin hole:	28 mm *33 mm*

1.12 STEERING

Make, model and type:	DANFOSS, OSPC 125 ON 150N 2019 or EATON, 261-1356-002, hydrostatic *DANFOSS, OSPC 125 ON 150N 2019 or EATON, 261-1356-002 or REXROTH, LAGC 125N 10/180-125/01, 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	
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 *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: 2388 mm
2397 mm

Track width adjustment:

	Minimum	Maximum	Adjustment method
	mm	mm	
Front	1625	1860	Reversing wheels and off-set lug rims
Rear	1500	1800	Reversing wheels and off-set lug rims

1.15 PROTECTIVE STRUCTURE

Make, model and type: ZETOR, UBK 7621, cab with integrated safety frame
ZETOR, UBK 7641, 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

OECD approval

Approval number: 4/0527
4/0730

Date of approval: 4th June 1998
20th June 2002

Nos. of minor modification certificates, if any: None

1.16 SEAT

1.16.1 Driver's seat

Make, model and type: GRAMMER, DS 85H/3A, upholstered seat with back rest and arm rests

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 85H1/90A	Mechanic	Hydraulic	150	60
MARS	Zetor 7211 5400	Mechanic	Hydraulic	150	60
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 85H1/90A*	*Mechanic*	*Hydraulic*	*150*	*60*
GRAMMER	*Maximo M*	*Pneumatic*	*Hydraulic*	*210*	*80*
GRAMMER	*Maximo XL*	*Pneumatic*	*Hydraulic*	*210*	*80*
GRAMMER	*Maximo XXL*	*Pneumatic*	*Hydraulic*	*210*	*80*
MARS	*Zetor 7211 5400*	*Mechanic*	*Hydraulic*	*150*	*60*
MARS	*Zetor 7211 5418*	*Mechanic*	*Hydraulic*	*150*	*60*

Type: Upholstered seat with back rest and arm rests

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 *1270*	145×80	215 *200*
Sidelights	1655 *1620*	60×65	650 *795*
Rearlights	1845 *1905*	140×40	815
Reflectors – 1st pair	1360 *1400*	Ø78	890 *905*
Reflectors – 2nd pair	*755*	*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
4380 *4245*	2165 *2190*	2315	2715 *2780*	2840 *2785*

2.2 GROUND CLEARANCE (unballasted tractor): 286 mm
362 mm

Clearance-limiting part: Swining drawbar
Swinging drawbar bracket

2.3 TRACTOR MASS (unballasted tractor with cab)

	Without driver	With driver
	kg	kg
Front	1630 *1745*	1645 *1760*
Rear	2420 *2530*	2480 *2590*
Total	4050 *4275*	4125 *4350*

2.4 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
Make	TAURUS *BARUM*	BARUM
Model	Energysaver Radial HT *TRZ 2*	TZR 2
Dimensions	14.9 R 24	18.4 R 38
Ply rating	126 A8	146 A8
Type	Radial	Radial
Maximum load (tyre manufacturer's)	17.00 kN	30.00 kN
Maximum load (tractor manufacturer's)	11.75 kN	25.75 kN
Inflation pressure (tyre manufacturer's)	160 kPa	160 kPa
Dynamic radius index	560 mm	820 mm
Chosen track width:	1710 mm	1735 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 *0.839 g/cm³ for p.t.o. supplementary tests on modified tractor* 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: 10
16

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 20th 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						
68.0	2100	1077	18.34	22.04	270	3.09
3.1.2 POWER AT RATED ENGINE SPEED						
67.3	2200	1128	18.75	22.54	279	2.99
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
67.9	1950	1000	17.48	21.01	257	3.23
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
67.3	2200	1128	18.75	22.54	279	2.99
3.1.4.2 85 % of torque obtained in 3.1.4.1						
58.4	2246	1152	17.16	20.63	294	2.83
3.1.4.3 75 % of torque defined in 3.1.4.2						
44.3	2274	1166	14.54	17.48	328	2.53
3.1.4.4 50 % of torque defined in 3.1.4.2						
30.0	2311	1185	12.06	14.50	402	2.07
3.1.4.5 25 % of torque defined in 3.1.4.2						
15.2	2342	1201	9.43	11.33	620	1.34
3.1.4.6 unloaded						
-	2381	1221	6.73	8.09	-	-

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						
67.9	1950	1000	17.48	21.01	257	3.23
3.1.5.2 85 % of torque obtained in 3.1.5.1						
62.0	2096	1075	17.18	20.65	277	3.00
3.1.5.3 75 % of torque defined in 3.1.5.2						
47.4	2137	1096	14.39	17.30	304	2.74
3.1.5.4 50 % of torque defined in 3.1.5.2						
32.2	2178	1117	11.76	14.13	365	2.28
3.1.5.5 25 % of torque defined in 3.1.5.2						
16.4	2221	1139	8.97	10.78	547	1.52
3.1.5.6 unloaded						
-	2266	1162	6.29	7.56	-	-

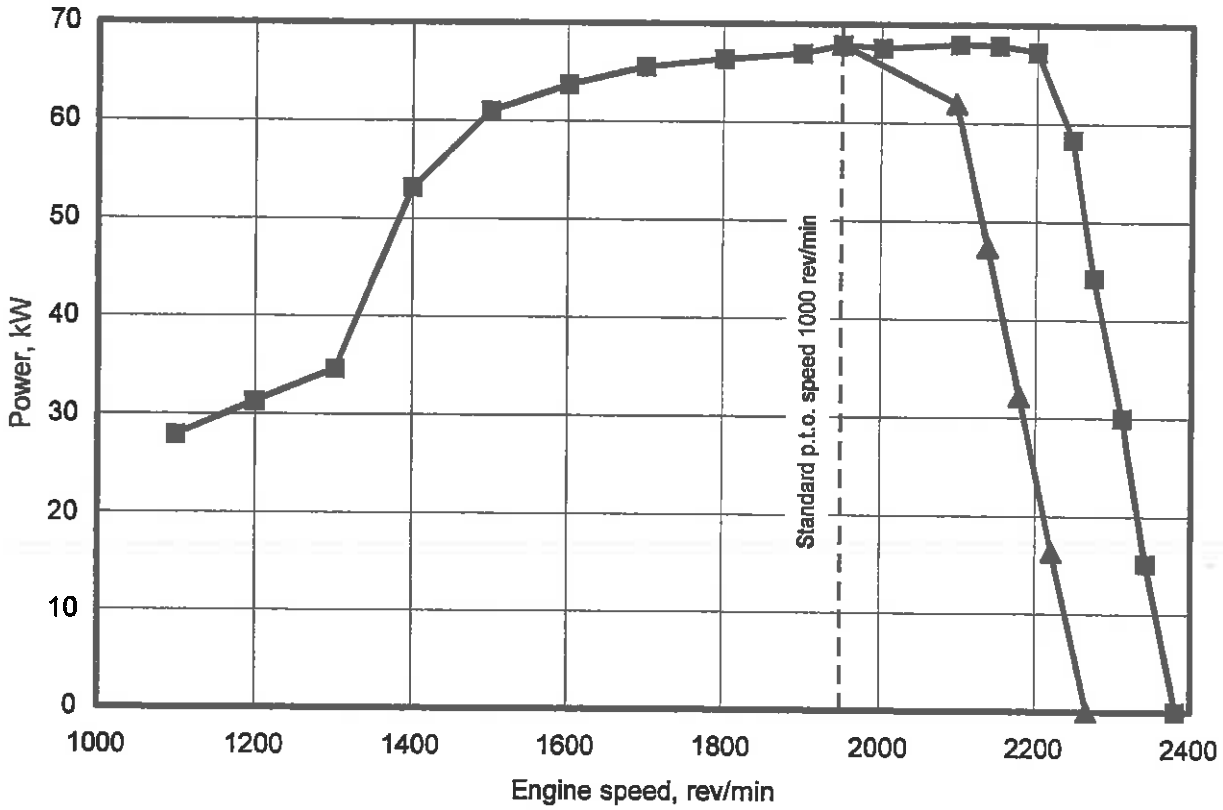
No load maximum engine speed: 2381 rev/min

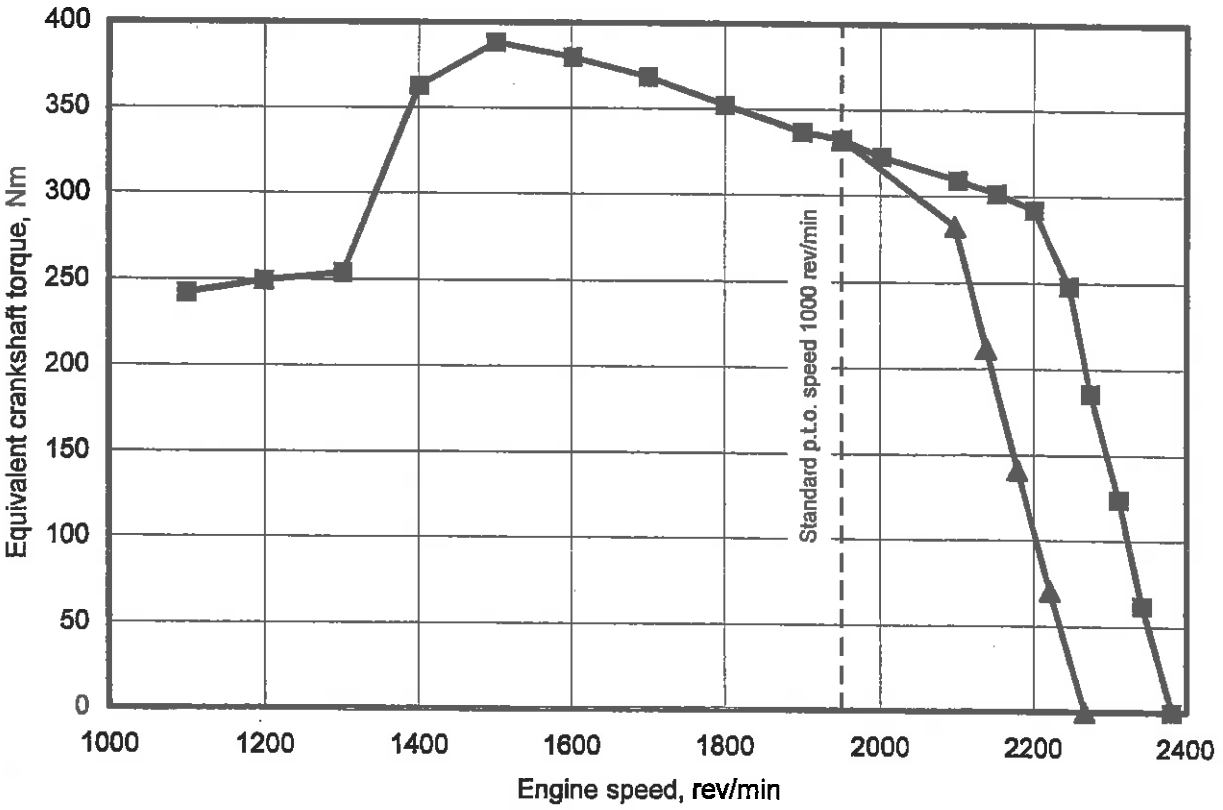
Torque (equivalent crankshaft)
At maximum power: 309.2 Nm
At rated engine speed: 292.1 Nm
At standard power take-off speed: 332.5 Nm

Maximum torque (equivalent crankshaft): 388.3 Nm
(engine speed: 1500 rev/min)

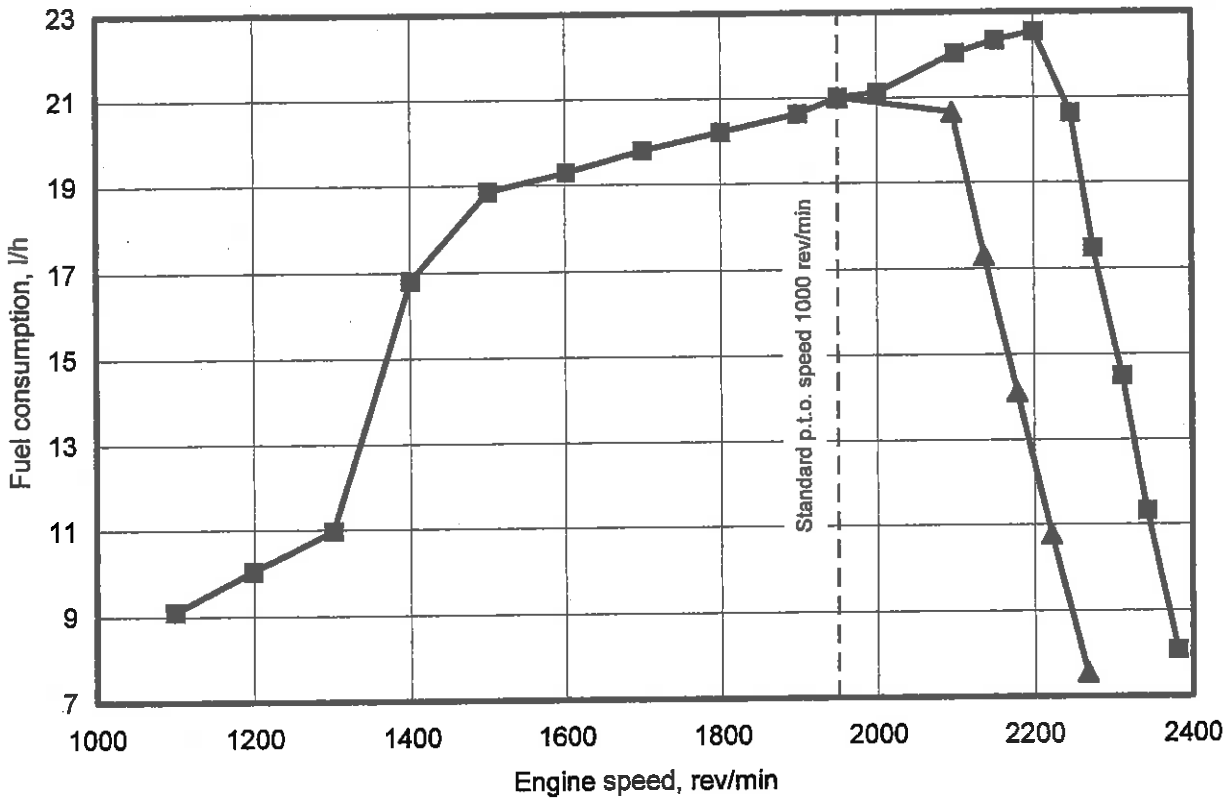
Mean atmospheric conditions:	
Temperature	21 °C
Pressure	97.5 kPa
Relative humidity	30 %
Maximum temperatures:	
Coolant	84 °C
Engine oil	109 °C
Fuel	45 °C
Engine air intake	35 °C

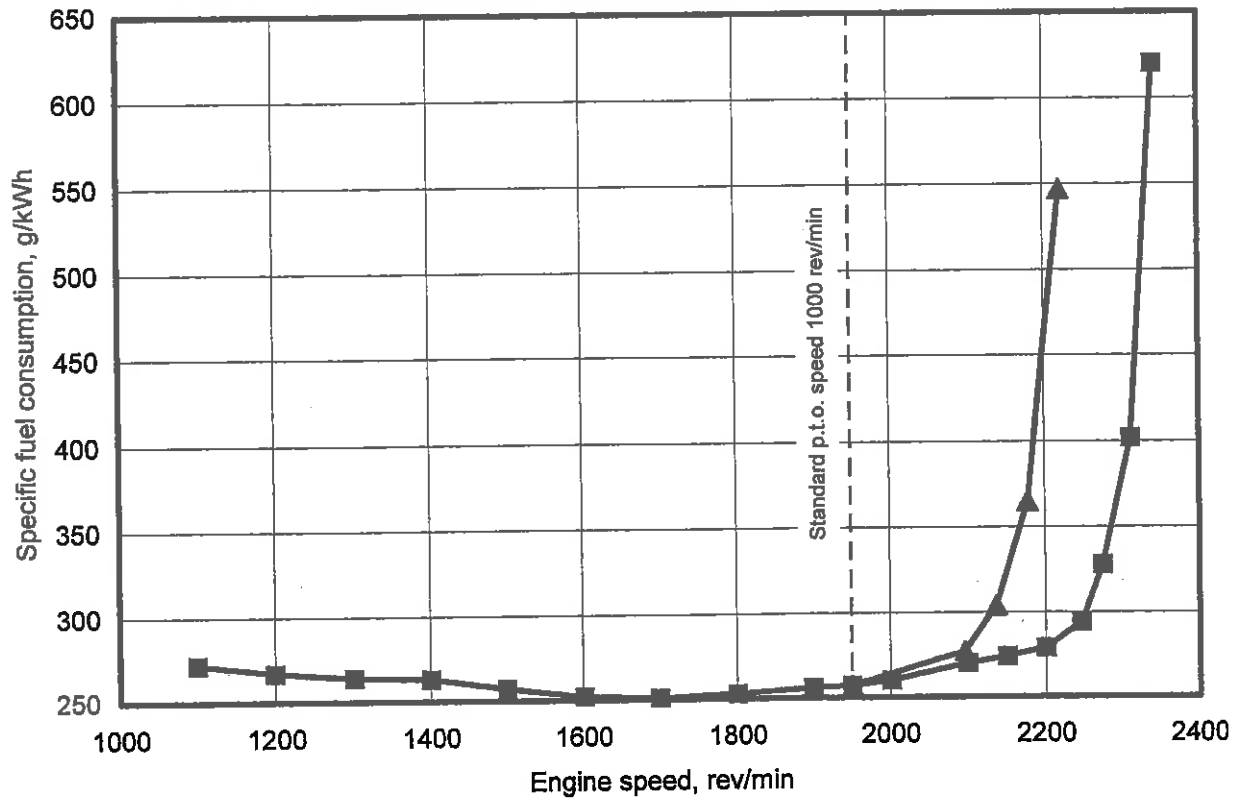
POWER TAKE-OFF TEST



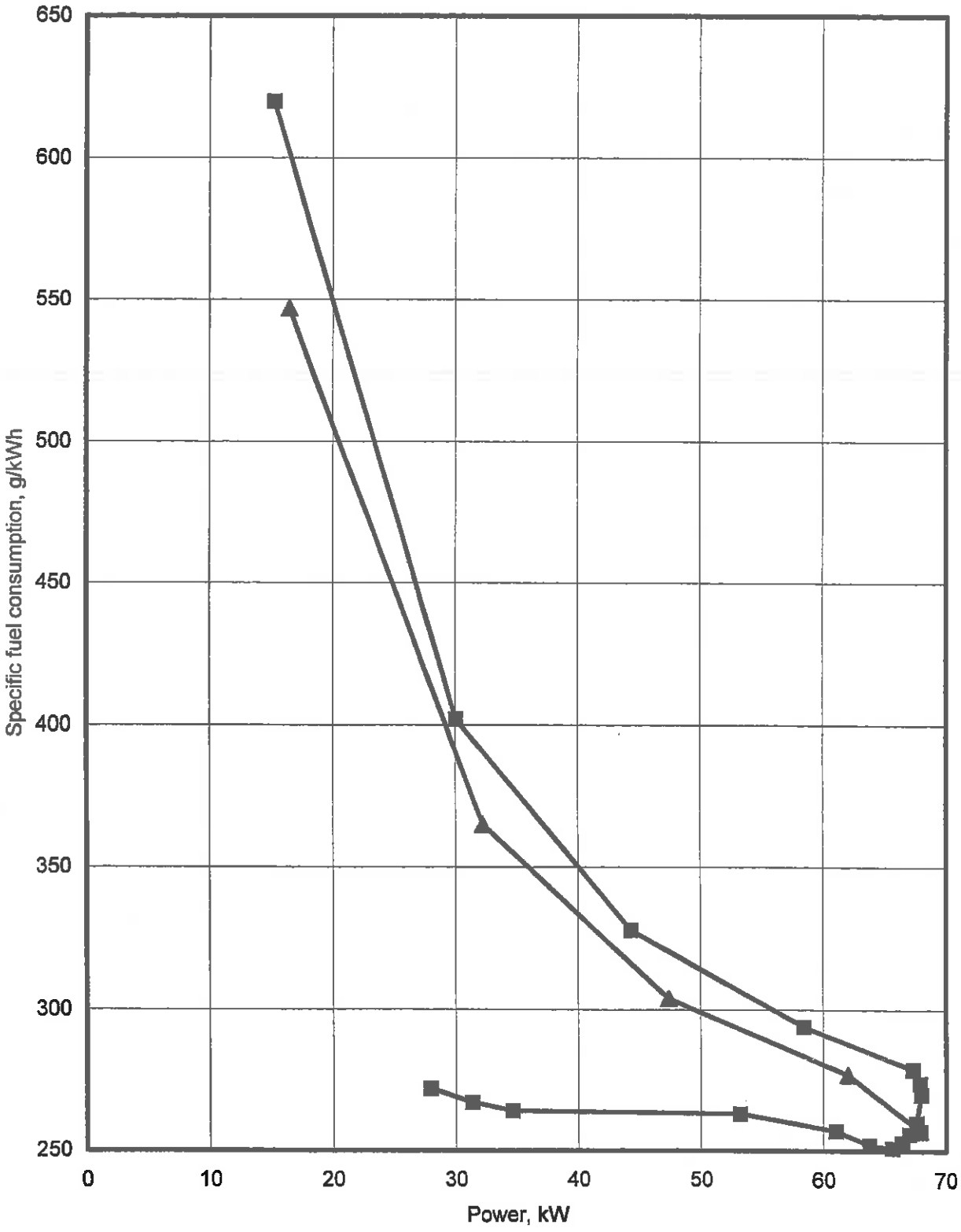


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 26th May 1998

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 19.3 MPa

Pump stalled: No

Pump delivery rate at minimum pressure: 66.0 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	29.0	17.4	8.4
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	60.0	16.2	16.2

Tapping point used for test: External tapping

Temperature of hydraulic fluid: 55 °C

Opening pressure of the unloading valve: Not applicable

Closing pressures of the unloading valve: Not applicable

3.2.2 Rear power lift test

Linkage setting for test – see page 13

	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	682 mm 632 mm	885 mm 828 mm
Maximum corrected force exerted through full range	48.9 kN	39.3 kN
Corresponding pressure of hydraulic fluid	17.4 MPa	17.4 MPa
Moment about rear-wheel axis	51.0 kNm	64.9 kNm
Maximum tilt angle of mast from vertical	-	9 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points												
mm	-514	-500	-400	-375	-300	-200	-100	0	+100	+200	+257	+314
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	-	-	-	48.9	52.2	54.2	56.0	56.7	57.6	58.5	59.1	-
Corresponding pressure: 17.4 MPa												
Lifting forces at the test frame												
kN	40.7	41.8	43.2	-	43.6	43.4	43.4	42.4	42.1	40.6	-	39.3
Corresponding pressure: 17.4 MPa												

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 9th June 1998

Type of track: Bituminous-concrete surface

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
374	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	38.3	35.4	3.89	2253	15.0	396
3 Lo M	43.9	35.4	4.46	2229	15.0	373
3 Lo H	49.3	35.1	5.06	2191	15.0	357
4 Lo L	51.6	34.5	5.38	2099	11.9	335
4 Lo M	54.5	30.1	6.52	2102	7.8	318
1 Hi L	54.7	28.2	6.98	2097	7.2	317
4 Lo H	54.0	25.4	7.66	2105	6.4	320
1 Hi M	55.0	24.1	8.22	2103	5.9	315
1 Hi H	55.4	20.8	9.59	2098	4.8	311
2 Hi L	54.8	19.0	10.38	2104	4.4	316
2 Hi M	54.0	16.0	12.15	2106	3.6	319
2 Hi H	53.7	13.7	14.10	2104	3.1	321
3.3.2 FUEL CONSUMPTION 3.3.2.1 in selected gear, at maximum power at rated speed						
1 Hi H	54.2	19.3	10.11	2200	4.4	323
3.3.2.1.1 75 % of pull at maximum power at rated speed						
1 Hi H	42.1	14.5	10.45	2246	3.2	357
3.3.2.1.2 50 % of pull at maximum power at rated speed						
1 Hi H	29.0	9.7	10.76	2285	1.8	429
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 Hi L	42.0	14.5	10.43	2081	3.2	333
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 Hi L	28.9	9.7	10.74	2113	1.8	394
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed						
1 Hi L	53.6	26.1	7.39	2198	6.5	330
3.3.2.2.1 75 % of pull at maximum power at rated speed						
1 Hi L	41.9	19.6	7.70	2249	4.5	355
3.3.2.2.2 50 % of pull at maximum power at rated speed						
1 Hi L	29.1	13.1	7.99	2293	2.9	423
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 Lo H	41.9	19.6	7.69	2067	4.5	329
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 Lo H	29.1	13.1	7.99	2114	2.9	386

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
2.12	52	84	104	22	55	96.8
2.25	53	84	107	23	56	96.8
2.35	54	85	106	23	56	96.8
2.51	55	86	108	24	56	96.9
2.64	55	86	107	25	54	96.9
2.65	56	86	106	27	49	96.9
2.63	57	86	107	27	49	96.8
2.67	57	86	107	27	50	96.7
2.70	58	86	107	27	50	96.7
2.66	58	86	107	27	51	96.7
2.63	59	88	109	26	53	96.7
2.62	59	88	108	26	53	96.7
2.60	57	86	103	27	50	96.7
2.36	56	88	104	25	56	96.7
1.96	60	88	105	25	56	96.7
2.52	56	89	106	24	60	96.6
2.13	58	88	102	24	60	96.6
2.54	53	86	104	27	49	96.9
2.37	59	87	105	26	53	96.7
1.99	62	87	106	26	53	96.7
2.55	56	87	104	26	54	96.7
2.17	58	87	103	26	54	96.7

4. OPTIONAL TESTS RESULTS

4.1 BRAKING

Date of tests: 28th May and 3rd to 4th June 1998

Tractor mass (with driver)

	Front	Rear	Total
	kg	kg	kg
Ballasted tractor	2350	5150	7500
Unballasted tractor	1645	2480	4125

4.1.1 Cold service braking device test

	Speed before application of brakes	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
	km/h	kN	m/s²	m
Ballasted tractor	36.3	0.105	0.85	59.81
		0.195	2.10	24.21
		0.310	3.16	16.09
		0.395	4.04	12.58
Unballasted tractor	36.9	0.105	1.40	37.52
		0.150	2.64	19.90
		0.190	3.01	17.45
		0.232	3.55	14.80
		0.265	4.03	13.04

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

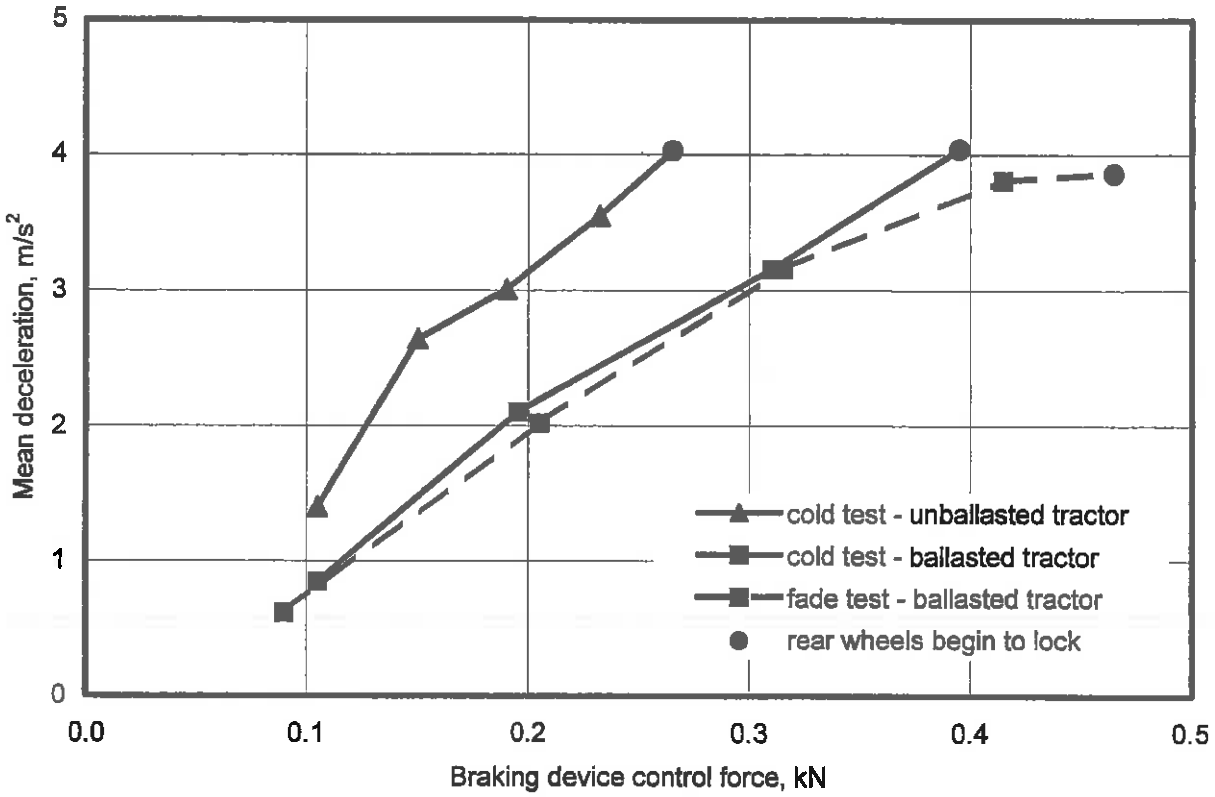
4.1.2 Fade test

	Speed before application of brakes	Braking device control force	Mean deceleration	Minimum stopping distance without locking the wheels
	km/h	kN	m/s²	m
Ballasted tractor	36.3	0.090	0.62	81.99
		0.205	2.02	25.17
		0.315	3.16	16.09
		0.415	3.81	13.34
		0.465	3.86	13.17

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
	kN	kN
Braking device control force	0.180	0.170

4.2 MEASUREMENT OF EXTERNAL NOISE

Date of tests: 6th May 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: 28.5 km/h

Sound level: 86.5 dB(A)

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

Gear number: 4 Hi H

Travelling speed before acceleration: 28.5 km/h

Sound level: 85.5 dB(A)

5. SUPPLEMENTARY TESTS RESULTS

5.1 MAIN POWER TAKE-OFF (modified tractor)

Date and location of tests: 6th August 2002, 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
5.1.1 MAXIMUM POWER – TWO-HOUR TEST						
69.2	2100	1077	18.61	22.18	269	3.12
5.1.2 POWER AT RATED ENGINE SPEED						
65.6	2200	1128	18.28	21.79	279	3.01
5.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
68.1	1950	1000	17.60	20.98	258	3.25
5.1.4 PART LOADS 5.1.4.1 the torque corresponding to maximum power at rated engine speed						
65.6	2200	1128	18.28	21.79	279	3.01
5.1.4.2 85 % of torque obtained in 3.1.4.1						
57.3	2262	1160	16.80	20.02	293	2.86
5.1.4.3 75 % of torque defined in 3.1.4.2						
43.7	2299	1179	14.27	17.01	327	2.57
5.1.4.4 50 % of torque defined in 3.1.4.2						
29.6	2334	1197	11.65	13.89	394	2.13
5.1.4.5 25 % of torque defined in 3.1.4.2						
15.0	2371	1216	8.91	10.62	594	1.41
5.1.4.6 unloaded						
-	2400	1231	6.32	7.53	-	-

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
5.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min] 5.1.5.1 the torque corresponding to maximum power						
68.1	1950	1000	17.60	20.98	258	3.25
5.1.5.2 85 % of torque obtained in 3.1.5.1						
59.4	2003	1027	15.70	18.71	264	3.17
5.1.5.3 75 % of torque defined in 3.1.5.2						
45.7	2053	1053	13.00	15.49	284	2.95
5.1.5.4 50 % of torque defined in 3.1.5.2						
31.2	2102	1078	10.49	12.50	336	2.50
5.1.5.5 25 % of torque defined in 3.1.5.2						
15.9	2143	1099	7.68	9.15	483	1.74
5.1.5.6 unloaded						
-	2180	1118	5.02	5.98	-	-

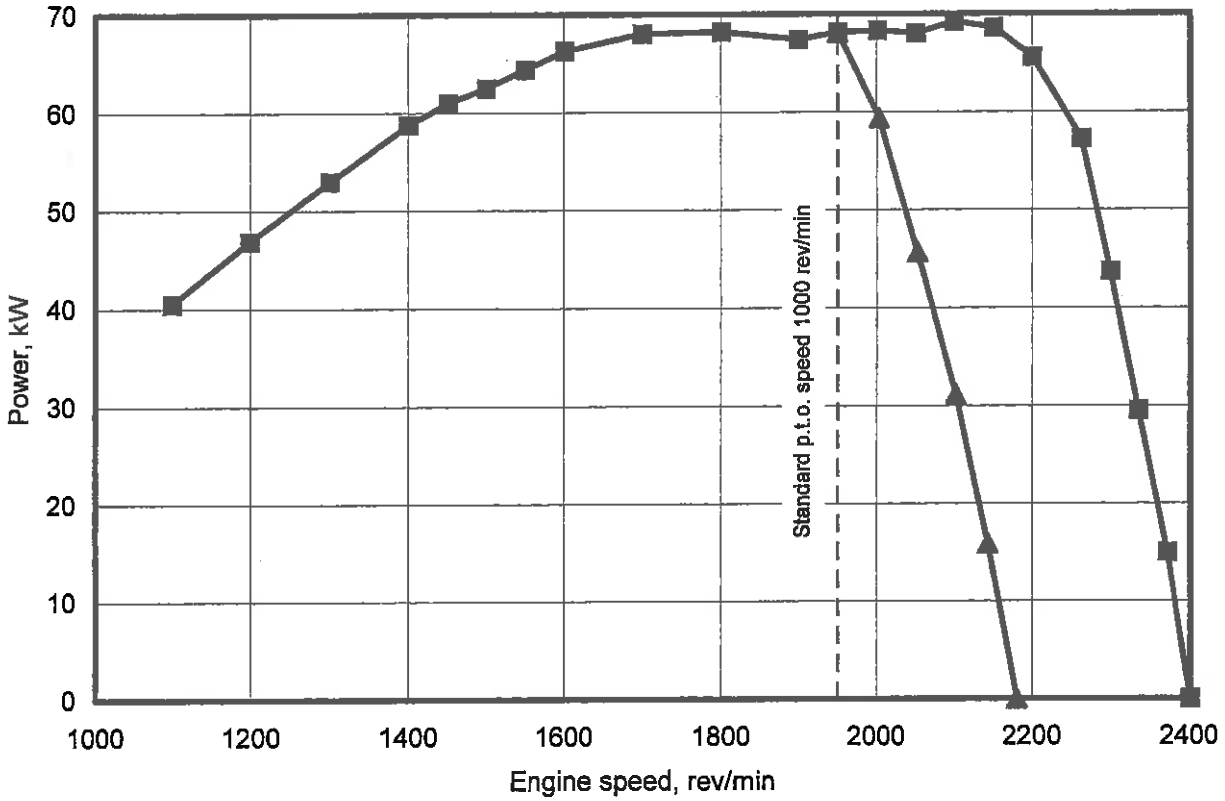
No load maximum engine speed: 2400 rev/min

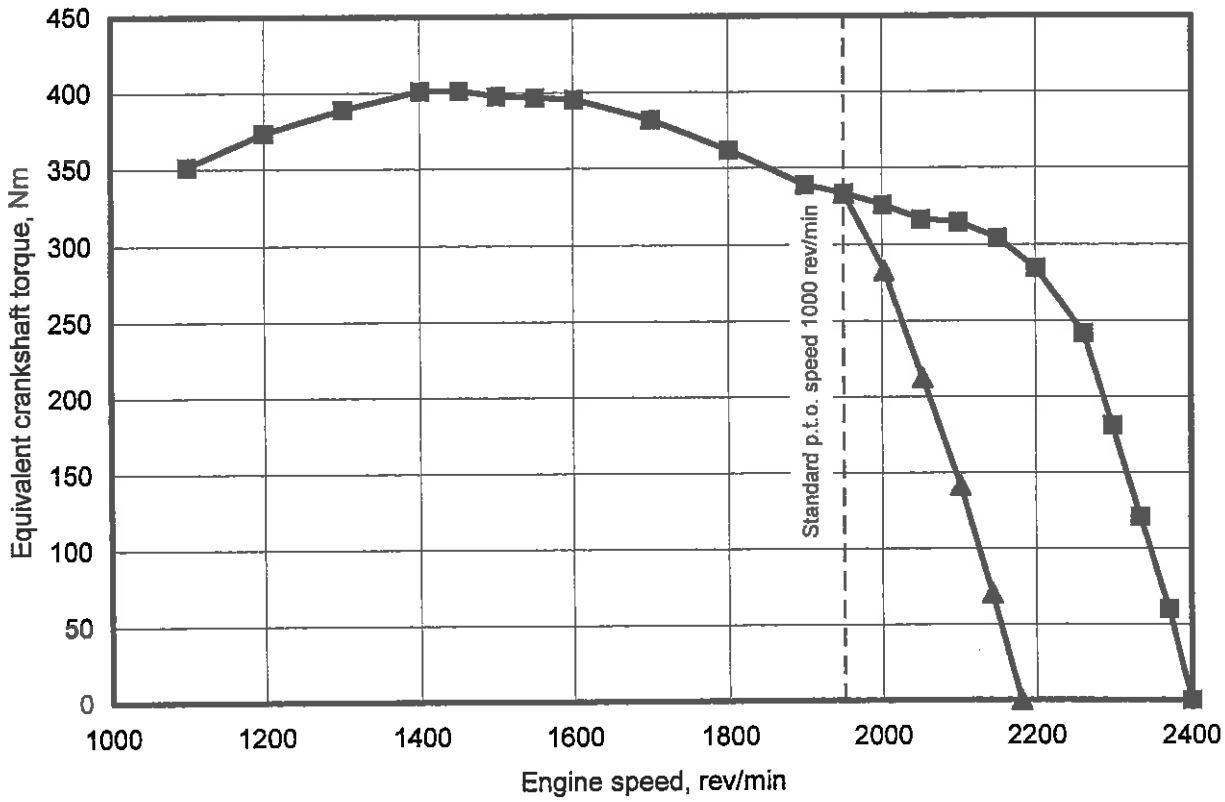
Torque (equivalent crankshaft)
At maximum power: 314.7 Nm
At rated engine speed: 284.7 Nm
At standard power take-off speed: 333.5 Nm

Maximum torque (equivalent crankshaft): 401.5 Nm
(engine speed: 1451 rev/min)

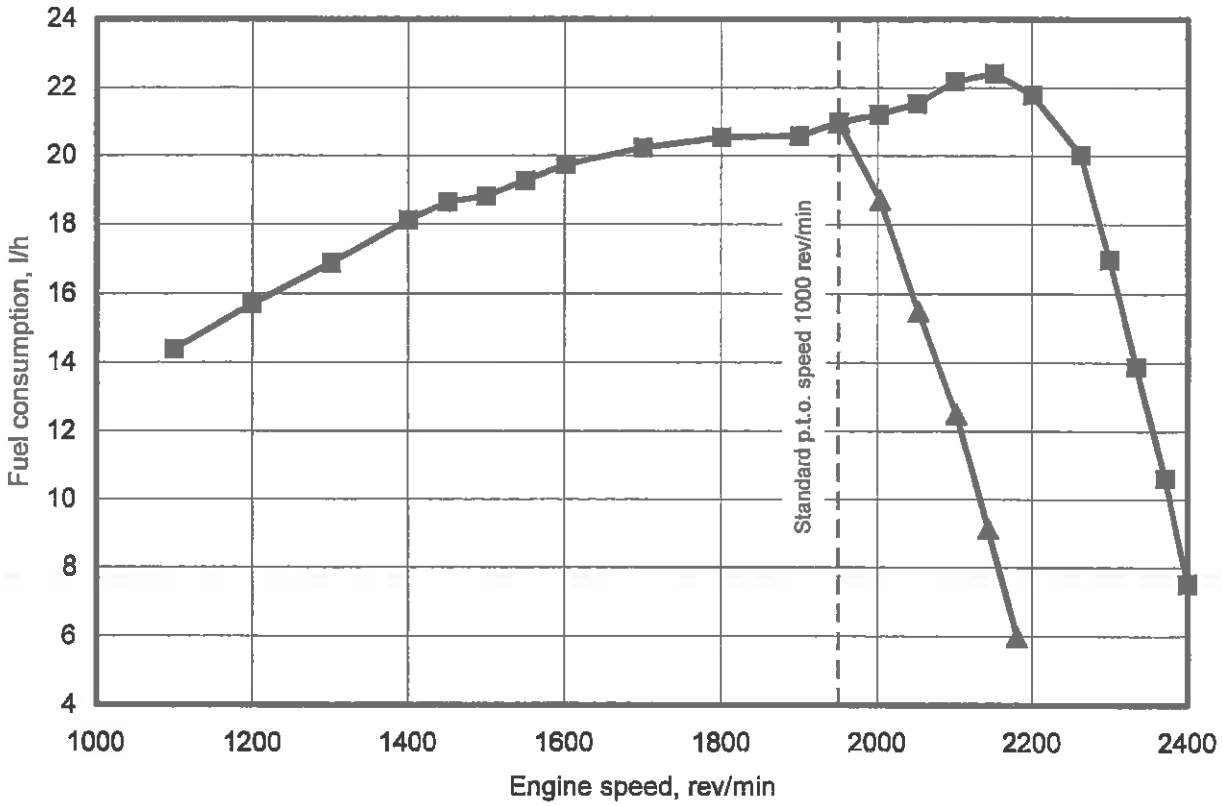
Mean atmospheric conditions:	
Temperature	24 °C
Pressure	96.6 kPa
Relative humidity	48 %
Maximum temperatures:	
Coolant	90 °C
Engine oil	112 °C
Fuel	47 °C
Engine air intake	35 °C

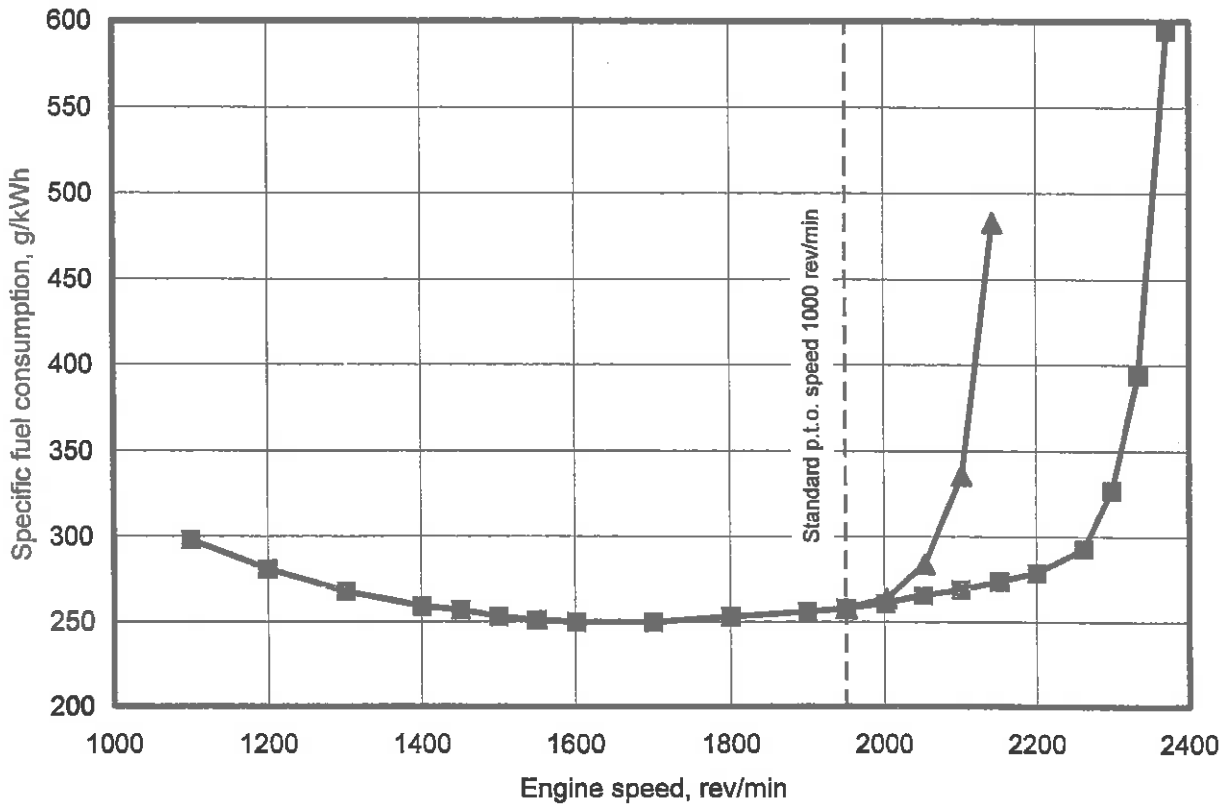
POWER TAKE-OFF TEST



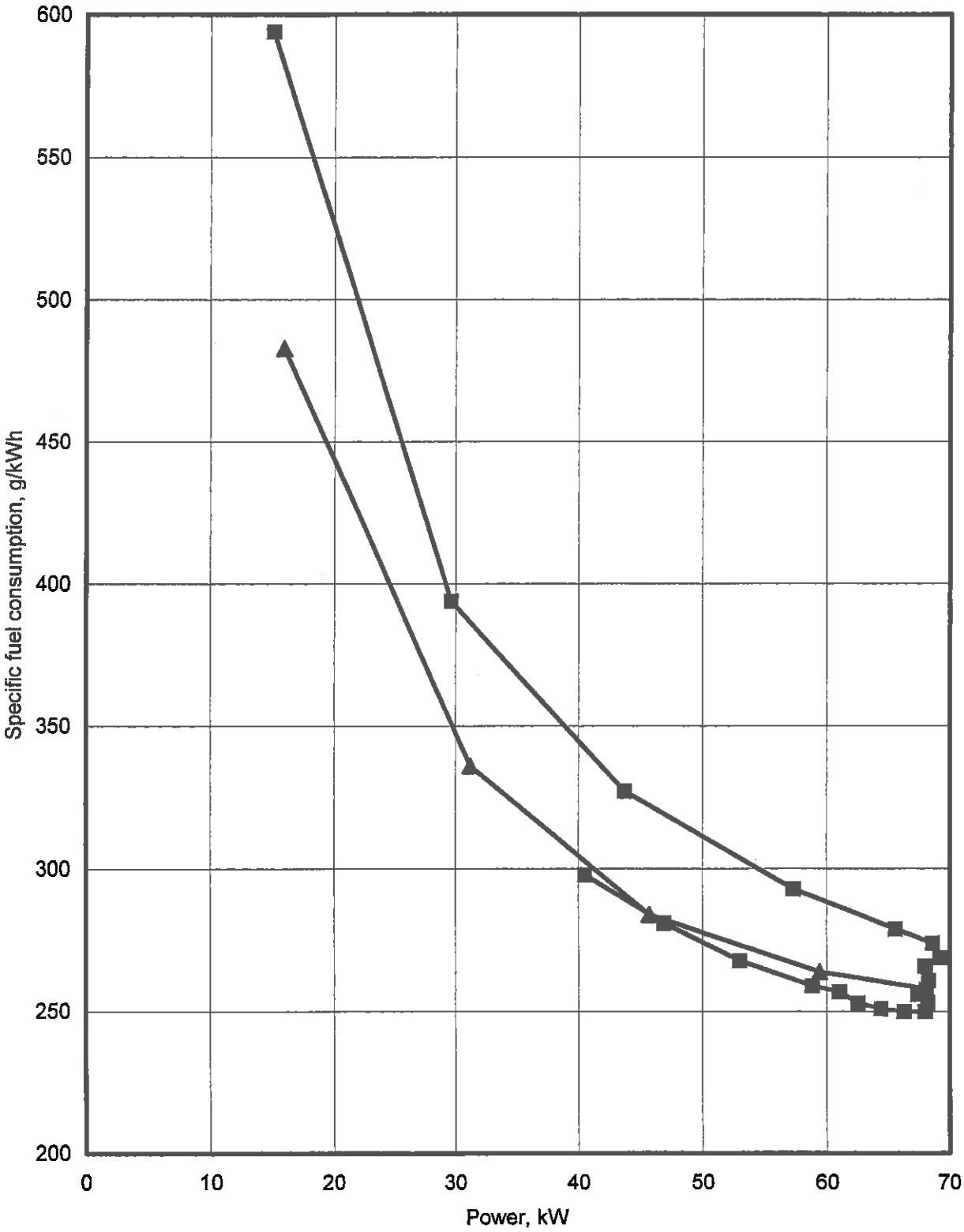


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



5.2 MEASUREMENT OF EXTERNAL NOISE (modified tractor)

Date of tests:	8th August 2002
Make and model of sound level meter:	BRÜEL & KJÆR, 2231
Type of track:	Bituminous-concrete surface

5.2.1 According to OECD standard code 1

Gear number:	4 Hi H
Travelling speed before acceleration:	31.1 km/h
Sound level:	87.0 dB(A)

5.2.2 According to EEC directives 74/151/EEC (Annex VI) and 97/54/EC

Gear number:	4 Hi H
Travelling speed before acceleration:	31.1 km/h
Sound level:	86.0 dB(A)

6. REPAIRS

None

7. REMARKS

None

Extensions granted by: Dipl. Ing. Peter Pernis

Signed:

Date: 9th August 2002

Head of the Tractor Laboratory

Peter Pernis

Dipl. Ing. Peter Pernis

STÁTNÍ ZKUŠEBNA ZEMĚDĚLSKÝCH, POTRAVINÁŘSKÝCH A LESNICKÝCH STROJŮ SZZPLS zkušební laboratoř 1

Director

Dipl. Ing. Josef Šenk, CSc.

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ERRATUM OF TEST REPORT

Subject:	Test report according to the OECD Code 2
O.E.C.D. approval number:	2/1774
Date of approval:	24th August 1998
Application:	ZETOR 10641 Forterra turbo (4WD) 40 km/h version

Changes needed:

1. Page 27, in the paragraph **4.2.1 According to OECD standard code 1**
   Travelling speed before acceleration: **28.5 km/h** instead of stated 29.5 km/h.

Signature:	Dipl. Ing. Peter Pernis
Date:	29th October 2002