STÁTNÍ ZKUŠEBNA ZEMĚDĚLSKÝCH, POTRAVINÁŘSKÝCH A LESNICKÝCH STROJŮ

SZZPLS
Třanovského 622/11
CZ-163 04 Praha 6 – Řepy
Czech Republic
Tel.: +420 2 3038111
Fax: +420 2.3015226
E-mail: szzpls@szzpls.cz

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 № 2/1 674/1

Date of approval: 5th June 2001



Agricultural Tractor

ZETOR 43 21 Super (2WD) 30 km/h version

with Emissions Compliant Engine

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

Report № 19700

Date of test: April 2001

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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:	11th April 2001

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:	2/1 674/1
Date of approval:	5th June 2001

ORIGINAL TEST REPORT

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

OECD approval number:	1674 Restricted Code
Date of approval:	21st July 1997
Make, model and type of tractor:	ZETOR, 4321 Super 30 km/h version, 2WD
Manufactured by:	ZETOR a.s., CZ-632 00 Brno, Czech Republic
Submitted for test by:	The manufacturer

The differences between the tractors ZETOR 4321 Super (2WD) 30 km/h version and ZETOR 4321 Super (2WD) 30 km/h version with Emissions Compliant Engine are written in *italics*, taking into account these differences, SZZPLS Praha has reproduced the main power take-off test 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:	65 hours
Location of test:	SZZPLS Praha, Czech Republic

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

Make of the tractor:	ZETOR
Model (trade name):	4321 Super 30 km/h version *4321 Super 30 km/h version with Emissions Compliant Engine*
Type:	2WD

1.1.1 Numbers

1st Serial № or prototype:	001 001 *U432103014B*
Serial №:	001 001 *U432103014B*

1.1.2 Other specifications

Model denomination(s) for other countries:	None
Transmission type or gears × ranges:	5 × 2
Speed version:	30 km/h
Manufacturer identification of technical type number:	None

1.2 ENGINE

Make:	ZETOR
Model:	6202 *6203*
Type:	4-stroke diesel engine, direct injection, water cooled, naturally aspirated
Serial №:	*001001* **6203-060281**

1.2.1 Cylinders

Number/disposition:	4, in-line, vertical
Bore/stroke:	102 mm/120 mm
Capacity:	3922 cm³

Compression ratio:	17.0:1
Arrangement of valves:	Overhead
Cylinder liners:	Wet, replaceable
1.2.2 Supercharging	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, 443 741 111 001, one-stage with paper cartridge *IMTESO, 443 752 020 808, one-stage with paper cartridge*
Capacity of fuel tank:	120 dm³
Make, model and type of injection pump:	MOTORPAL, 4M 3065, in-line *MOTORPAL, 4M 3463, in-line*
Serial №:	V 9004 *LG 0057*
Manufacturer's production setting of injection pump	
Flow rate (rated engine speed and full load):	12.42+0.38 dm³/h *12.89-0.32 dm³/h*
Timing:	25°+1° before TDC *18°±0.5° before TDC*
Make, model and type of injectors:	MOTORPAL, DOP 160 S 430-1436, 4 hole *MOTORPAL, DOP 160 S 428-4144, 4 hole*
Injection pressure:	18.6-0.8 MPa *22.0-0.8 MPa*
Fuel cooler:	None
1.2.4 Governor	
Make, model and type:	MOTORPAL, RV 3M 350/1100 3300, centrifugal, variable speed *MOTORPAL, RV 3M 350 1100 3366, centrifugal, variable speed*
Governed range of engine speed:	From 700 to 2440 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:	WOODGATE, WGCS 1175 or DONALDSON, FGL 08-0560, dry with paper primary and safety elements, integrated cyclon type pre-cleaner *FILTREL, WGCS 1175 or DONALDSON, FGL 08-0560, dry with paper primary and safety elements, integrated cyclon type pre-cleaner*
Maintenance indicator:	Indicator on air cleaner

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:	None

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:	380 mm
Coolant capacity:	11.6 dm³
Type of temperature control:	Thermostat
Superpressure system:	40±10 kPa

1.2.8 Starting system

Make, model and type:	MAGNETON, 443 115 144 722, electrical, solenoid engaged
Starter motor power rating:	2.9 kW
Cold starting aid:	None *Intake air heating-up*
Safety device:	Gear change lever in neutral position *Clutch pedal to be fully depressed*

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, 43.014.020, expansion and absorption muffler with additional muffler
Location:	Left-hand side of engine, vertical

1.3 TRANSMISSION

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

Make, model and type:	ZETOR, 7901 1120, dual dry for travelling and p.t.o.
Number of plates:	2

Diameter of plates: 310 mm

Method of operation: Hydraulically by pedal

1.3.2 Gear box

Make, model and type: ZETOR, 53.122.000, mechanical

Description: Synchromesh gear box with 5 forward and 1 reverse speeds, group gear box with two speed ranges (T and R)

	Forward	Reverse
Number of gears	5	1
Number of groups	2	2
Total of arrangements	10	2

Available options: Synchromesh gear box with 5 forward and 1 reverse speeds, group gear box with two speed ranges (T and R) and pneumatically actuated torque multiplier (M and N)

	Forward	Reverse
Number of gears	5	1
Number of ranges	2	2
Number of groups	2	2
Total of arrangements	20	4

Available options: Synchromesh gear box with 5 speeds, group gear box with two speed ranges (T and R) and reverser (F and R)

	Forward	Reverse
Number of gears	5	5
Number of groups	2	2
Total of arrangements	10	10

Available options: Synchromesh gear box with 5 forward and 1 reverse speeds, group gear box with two speed ranges (T and R) and creeper (C and N)

	Forward	Reverse
Number of gears	5	1
Number of ranges	2	2
Number of groups	2	2
Total of arrangements	20	4

Oil cooler: None

1.3.3 Rear axle and final drives

Make, model and type: ZETOR, 53.161.000, crown wheel and bevel pinion differential and spur gear 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:	ZETOR, 7211 3300, telescopic with adjustable track

1.3.5 Total ratios and travelling speeds (version fitted on the tested tractor)

Gear №	Group	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	T	376.448	1.64
2		268.538	2.30
3		206.489	2.99
4		128.531	4.81
5		81.013	7.63
1	R	96.301	6.42
2		68.696	8.99
3		52.823	11.70
4		32.880	18.79
5		20.724	29.82
R	T	276.675	2.23
	R	70.777	8.73
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)			

T: Turtle group, R: Rabbit group

1.3.5 Total ratios and travelling speeds (optional – gear box with torque multiplier)

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	T	M	494.209	1.25
		N	376.448	1.64
2		M	352.542	1.75
		N	268.538	2.30
3		M	271.083	2.28
		N	206.489	2.99
4		M	168.738	3.66
		N	128.531	4.81
5		M	106.356	5.81
		N	81.013	7.63
1	R	M	126.426	4.89
		N	96.301	6.42
2		M	90.185	6.85
		N	68.696	8.99
3		M	69.347	8.91
		N	52.823	11.70
4		M	43.166	14.31
		N	32.880	18.79
5		M	27.207	22.71
		N	20.724	29.82
R	T	M	363.225	1.70
		N	276.675	2.23
	R	M	92.918	6.65
		N	70.777	8.73
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)				

T: Turtle group, R: Rabbit group, M: Torque multiplier engaged, N: Normal (Torque multiplier disengaged)

1.3.5 Total ratios and travelling speeds (optional – gear box with reverser)

Gear №	Group	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	T	376.448	1.64
2		268.538	2.30
3		206.489	2.99
4		128.531	4.81
5		81.013	7.63
1	R	96.301	6.42
2		68.696	8.99
3		52.823	11.70
4		32.880	18.79
5		20.724	29.82
Reverse			
1	T	342.986	1.80
2		244.668	2.53
3		188.135	3.28
4		117.106	5.28
5		73.812	8.37
1	R	87.741	7.04
2		62.589	9.87
3		48.127	12.84
4		29.957	20.63
5		18.882	32.72
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)			

T: Turtle group, R: Rabbit group

1.3.5 Total ratios and travelling speeds (optional – gear box with creeper)

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	T	C	3491.431	0.18
2			2490.598	0.25
3			1915.119	0.32
4			1192.081	0.52
5			751.372	0.82
1		N	376.448	1.64
2			268.538	2.30
3			206.489	2.99
4			128.531	4.81
5			81.013	7.63
1	R	C	893.157	0.69
2			637.130	0.97
3			489.914	1.26
4			304.951	2.03
5			192.212	3.21
1		N	96.301	6.42
2			68.696	8.99
3			52.823	11.70
4			32.880	18.79
5			20.724	29.82
R	T	C	2566.071	0.24
		N	276.675	2.23
	R	C	656.437	0.94
		N	70.777	8.73
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)				

T: Turtle group, R: Rabbit group, C: Creeper engaged, N: Normal (Creeper disengaged)

1.4 POWER TAKE-OFF

1.4.1 Main power take-off

Type:	Independent
Method of engagement:	Mechanically operated by hand lever or hydraulically by clutch pedal, through second plate in main clutch
Number of shafts:	1 interchangeable shaft, 6 or 21 splines
Method of changing power take-off shaft ends and speeds:	Manually replace shafts, shiftable by hand lever

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: 752 mm

Distance from the median plane of the tractor: 0 mm

Distance behind rear-wheel axis: 263 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	1994	3.6923	None
	596	2200		
1000	1000	2050	2.0500	None
	1073	2200		

Direction of rotation (viewed from behind tractor): Clockwise

1.4.1.2 Power take-off proportional to ground speed

Indicate p.t.o. and 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	
T	0.095	49.5082
R	0.370	12.6649
(*) Independent of adjusting p.t.o. speed 540 or 1000 rev/min		

T: Turtle group, R: Rabbit 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: Pneumatically operated by hand lever, through dry multiplate 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 8759-1:1998
	mm		
1000	34.9	21	Yes

Height above ground: 687 mm

Distance from the median plane of the tractor: 0 mm

Distance in front front-wheel axis: 537 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	1818	1.8182	30.0/286.5
	1210	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: ZETOR, 53.940.039, 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 full flow with replaceable paper element

Site of oil reservoir: Transmission housing

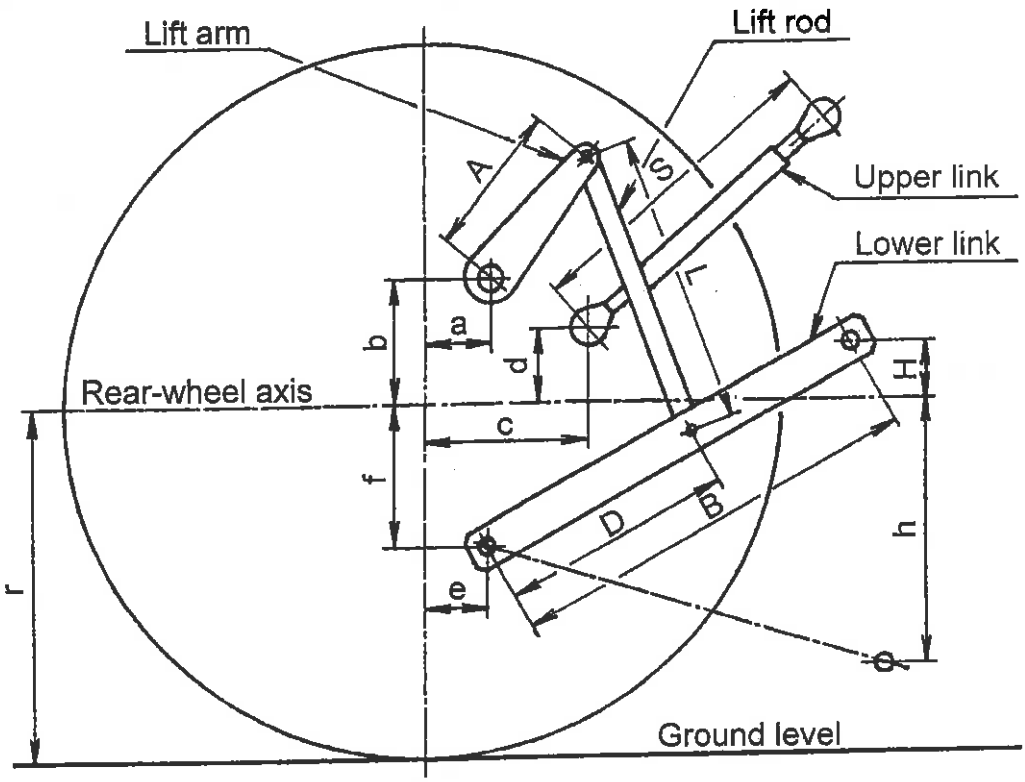
Type, number and location of tapping points: ISO standard couplings 12.5 mm, 1 double acting control valves, 2 pressure and 1 return couplings at rear of tractor

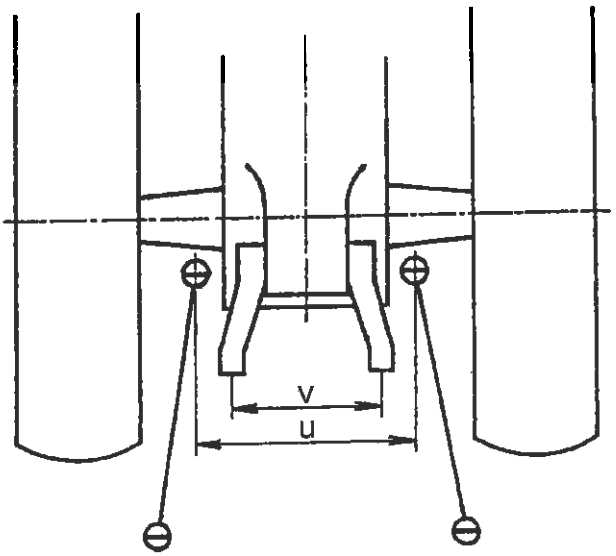
Maximum volume of oil available to external cylinders: 20 dm^3

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)	320	320
Length of lower links		(B)	861	861
Distance of lift arm pivot point from rear-wheel axis:	horizontally	(a)	30	30
	vertically	(b)	363	363
Horizontal distance between the 2 lower link points		(u)	450	450
Horizontal distance between the 2 lift arm end points		(v)	639	639
Length of upper link		(S)	550 to 760	694
Distance of upper link pivot point from rear-wheel axis:	horizontally	(c)	288	288
	vertically	(d)	182, 229, 276, 323	229
Distance of lower link pivot point from rear-wheel axis:	horizontally	(e)	83	83
	vertically	(f)	138	138
Distance of lower link pivot points to lift rod pivot points on lower links		(D)	402	402
Length of lift rods		(L)	442 to 572	565
Height of lower hitch points relative to the rear-wheel axis:				
	in low position	(h)	252 to 575	545
	in high position	(H)	121 to 372	150
Height above ground of lower hitch points when locked in transport position (*)			Any height withing lift range	
(*) Assuming r=745 mm tyre dynamic radius index of ISO 4251-1:1998				

1.7 SWINGING DRAWBAR

Type:	Clevis
Height above ground	
Maximum:	747 mm
Minimum:	337 mm
Type of adjustment:	Inverting drawbar and clevis and sliding drawbar in two distance of hitch point from power take-off shaft end – 355 and 405 mm
Distance of hitch point from rear-wheel axis, horizontally:	604, 614 and 618 mm for 355 mm, 653, 664 and 668 for 405 mm
Distance of hitch point from power take-off shaft end	
Vertically:	5, 115, 305 and 415 mm
Horizontally:	341, 351 and 355 mm for 355 mm, 390, 401 and 405 mm for 405 mm
Lateral adjustment (centre of clevis)	
Right-hand:	75 and 150 mm for 355 mm, 80 and 160 mm for 405 mm
Left-hand:	75 and 150 mm for 355 mm, 80 and 160 mm for 405 mm

Distance of pivot point from rear-wheel axis, horizontally:	185 mm to front
Diameter of drawbar pin hole:	32 mm
Maximum vertical permissible load:	12 kN for the height above ground 447 and 747 mm and 6 kN for the height above ground 337 and 637 mm

1.8 TRAILER HITCH (on request available, not fitted to tested tractor)

Type:	Automatic clevis
Hole diameter:	35 mm
Height above ground:	752, 802, 852, 902 and 952 mm
Distance of hitch point from rear-wheel axis, horizontally:	628 mm
Distance of hitch point from power take-off shaft end	
Vertically:	0, 50, 100, 150 and 200 mm
Horizontally:	365 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:	895 mm
Minimum:	200 mm
Horizontal distance to power take-off shaft end (rear):	681 mm

1.10 FRONT TOWING HITCH

Height above ground:	697 mm
Diameter of pin hole:	31 mm

1.11 STEERING

Make, model and type:	EATON, 261-1312-002 or DANFOSS, OSPC 100 ON or RCD-CALZONI, GIVI ON 100 G 125 or ZF, LAGC 100-1712-2, 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

1.12 BRAKES

1.12.1 Service brake

Rear axle

Make, model and type:	KNOTT, 33.227.000, 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, actuated by tractor pedals

1.12.2 Parking brake

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

1.13 WHEELS

Number

Front:	2, steering
Rear:	2, driving
Wheelbase:	2257 mm

Track width adjustment:

	Minimum	Maximum	Adjustment method
	mm	mm	
Front	1420	1795	By extending of front axle
Rear	1420	1795	Reversing wheels and off-set lug rims

1.14 PROTECTIVE STRUCTURE

Make, model and type:	ZETOR, UBK 7341, cab with integrated 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:	CSS 0404/29 with seat MARS Zetor 7211-5400 CSS 0404/30 with seat KAB XH2/U4 Fieldmaster CSS 0404/31 with seat KAB XH2/T6 Ploughmaster or seat GRAMMER DS 85H1/90A CSS 0404/32 with seat GRAMMER DS 85H/3A
Date of approval:	6th January 1997
Nos. of minor modification certificates, if any:	None

1.15 SEAT

1.15.1 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

1.15.2 Optional driver's seat(s)

Make	Model	Type of suspension	Type of damping	Range of adjustment	
				Longitudinally	Vertically
				mm	mm
GRAMMER	DS 85H/3A	Mechanic	Hydraulic	150	60
GRAMMER	DS 85H1/90A	Mechanic	Hydraulic	150	60
KAB	XH2/T6 Ploughmaster	Mechanic	Hydraulic	150	70
KAB	XH2/U4 Fieldmaster	Mechanic	Hydraulic	150	70

Type:	Upholstered seat with back rest and arm rests
Safety belt:	No

1.15.3 Passenger seat

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

1.16 LIGHTING

	Height above ground of centre	Size	Distance from outside edge of lights to median plane of tractor
	mm	mm	mm
Headlights	1275	145×80	195
Sidelights	1550	60×65	615
Rearlights	1670	140×40	800
Reflectors		Not fitted	

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
3370	1925	2250	2640	2890

2.2 GROUND CLEARANCE (unballasted tractor): 408 mm

Clearance-limiting part: Swinging drawbar

2.3 TRACTOR MASS (unballasted tractor with cab)

	Without driver	With driver
	kg	kg
Front	1115	1135
Rear	2010	2065
Total	3125	3200

2.4 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
Make	BARUM	BARUM
Model	TP 8	TZ 17
Dimensions	7.50-20	16.9-34
Ply rating	6 PR	8 PR
Type	Diagonal	Diagonal
Maximum load (tyre manufacturer's)	8.75 kN	23.80 kN
Maximum load (tractor manufacturer's)	8.65 kN	20.00 kN
Inflation pressure (tyre manufacturer's)	275 kPa	170 kPa
Dynamic radius index	420 mm	745 mm
Chosen track width:	1420 mm	1495 mm

2.5 FUEL

Type: Diesel fuel, in conformity with national standard ČSN EN 590

Density at 15 °C: 0.842 g/cm³ for p.t.o. tests
0.837 g/cm³ for p.t.o. supplementary tests on modified tractor
0.843 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	12.0	200	200
Gear box	62.0	1200	600
Rear axle		Common with gear box	
Final drive (rear)	2×1.9	1200	-
Hydraulic system		Common with gear box	
Steering	3.1	1200	1200

2.6.2 Specifications

	Recommended	Used during test
Engine oil: Type Viscosity Classification	 SAE 15W-40 14.6 cSt at 100 °C API CF-4/SG	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	 ARAL Vitam HF 32 7.2 cSt at 100 °C ISO 6743 HF 32	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: 21st March 1997, 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						
40.5	2200	1073	10.90	12.95	269	3.13
3.1.2 POWER AT RATED ENGINE SPEED						
40.5	2200	1073	10.90	12.95	269	3.13
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
39.2	2050	1000	10.16	12.07	259	3.25
3.1.4 PART LOADS 3.1.4.1 the torque corresponding to maximum power at rated engine speed						
40.5	2200	1073	10.90	12.95	269	3.13
3.1.4.2 85 % of torque obtained in 3.1.4.1						
36.4	2325	1134	10.19	12.10	280	3.01
3.1.4.3 75 % of torque defined in 3.1.4.2						
27.7	2360	1151	8.42	10.00	304	2.77
3.1.4.4 50 % of torque defined in 3.1.4.2						
18.7	2392	1167	6.78	8.05	363	2.32
3.1.4.5 25 % of torque defined in 3.1.4.2						
9.4	2413	1177	5.24	6.22	557	1.51
3.1.4.6 unloaded						
-	2440	1190	3.85	4.57	-	-

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						
39.2	2050	1000	10.16	12.07	259	3.25
3.1.5.2 85 % of torque obtained in 3.1.5.1						
34.4	2118	1033	9.27	11.01	269	3.12
3.1.5.3 75 % of torque defined in 3.1.5.2						
26.3	2157	1052	7.62	9.05	290	2.91
3.1.5.4 50 % of torque defined in 3.1.5.2						
17.8	2194	1070	6.08	7.22	342	2.47
3.1.5.5 25 % of torque defined in 3.1.5.2						
9.1	2230	1088	4.65	5.52	511	1.65
3.1.5.6 unloaded						
-	2251	1098	3.35	3.98	-	-

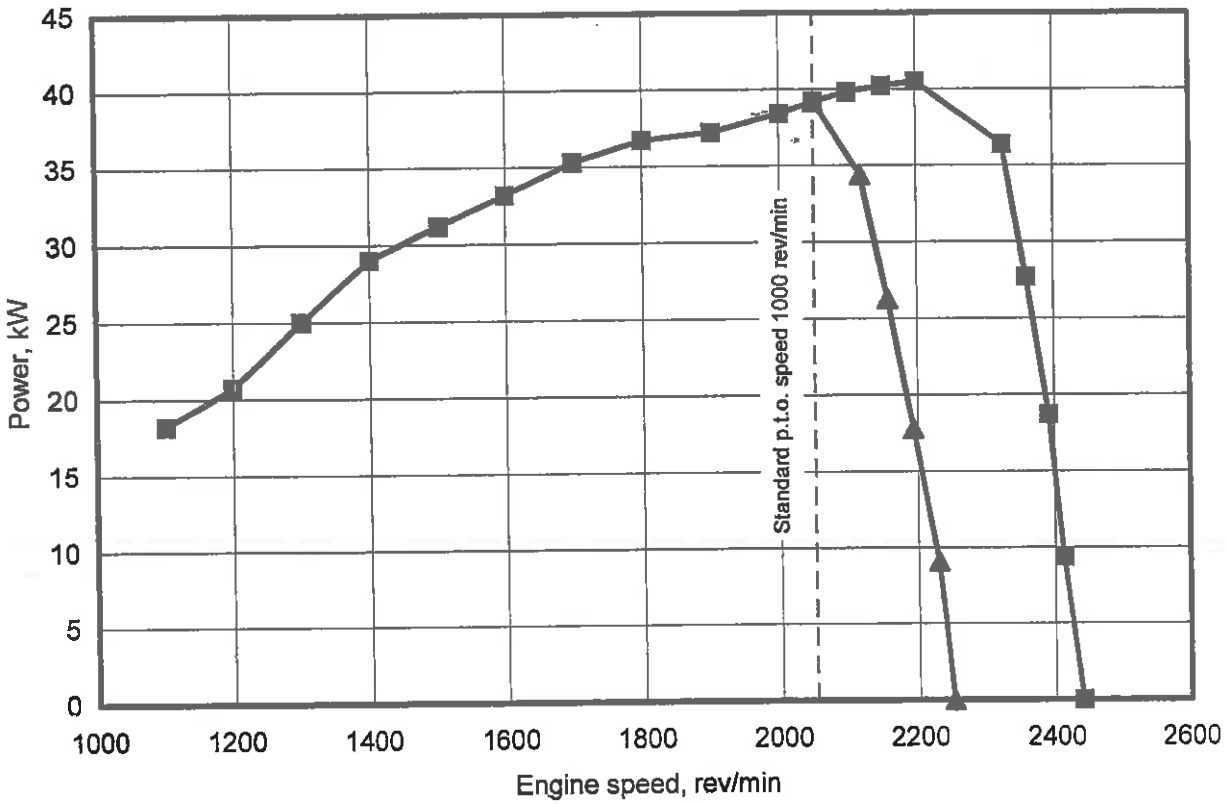
No load maximum engine speed: 2440 rev/min

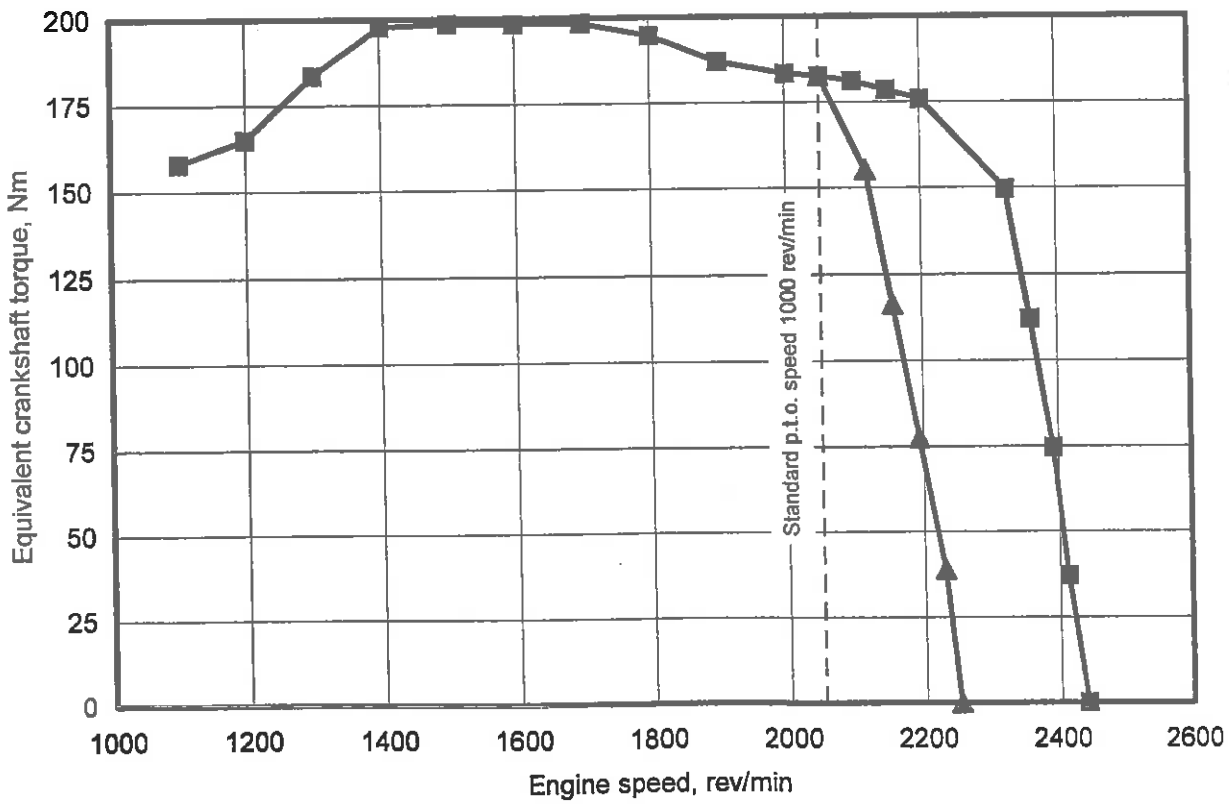
Torque (equivalent crankshaft)
At maximum power: 175.8 Nm
At rated engine speed: 175.8 Nm
At standard power take-off speed: 182.6 Nm

Maximum torque (equivalent crankshaft): 198.5 Nm
(engine speed: 1501 rev/min)

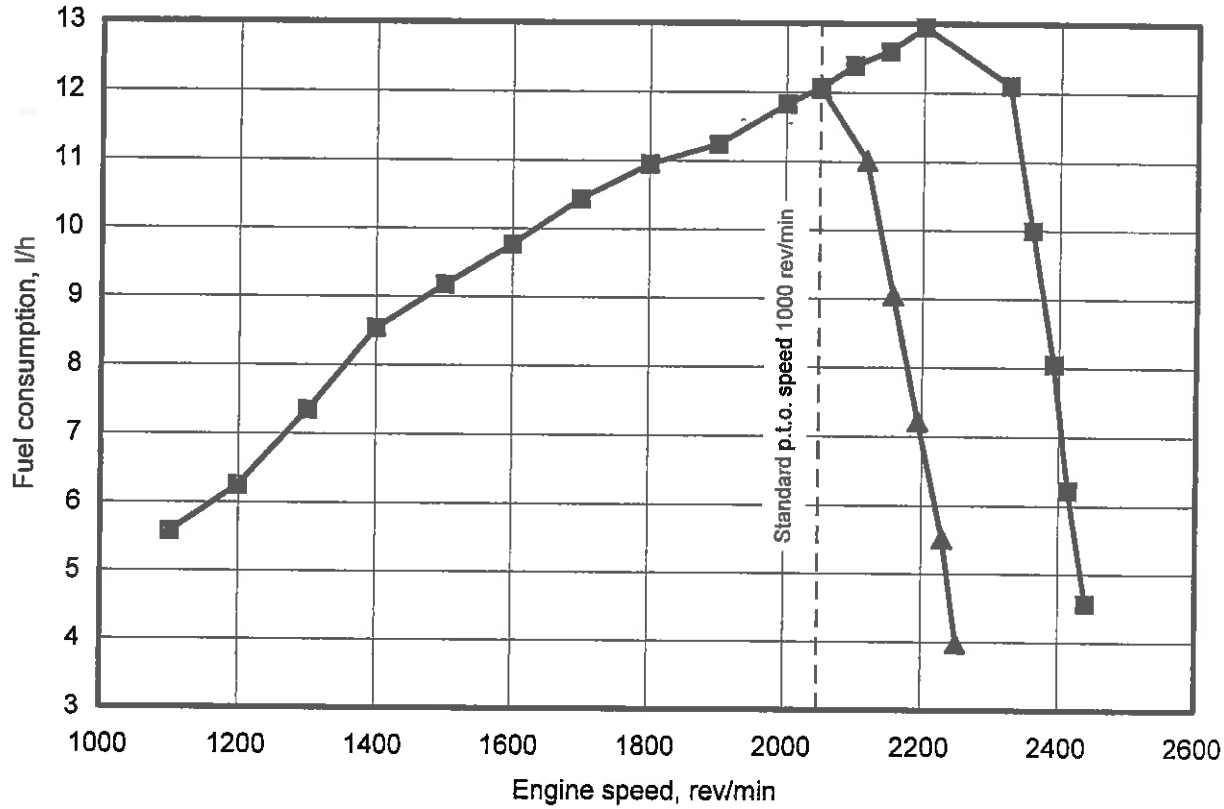
Mean atmospheric conditions:	
Temperature	26 °C
Pressure	97.0 kPa
Relative humidity	29 %
Maximum temperatures:	
Coolant	78 °C
Engine oil	103 °C
Fuel	43 °C
Engine air intake	34 °C

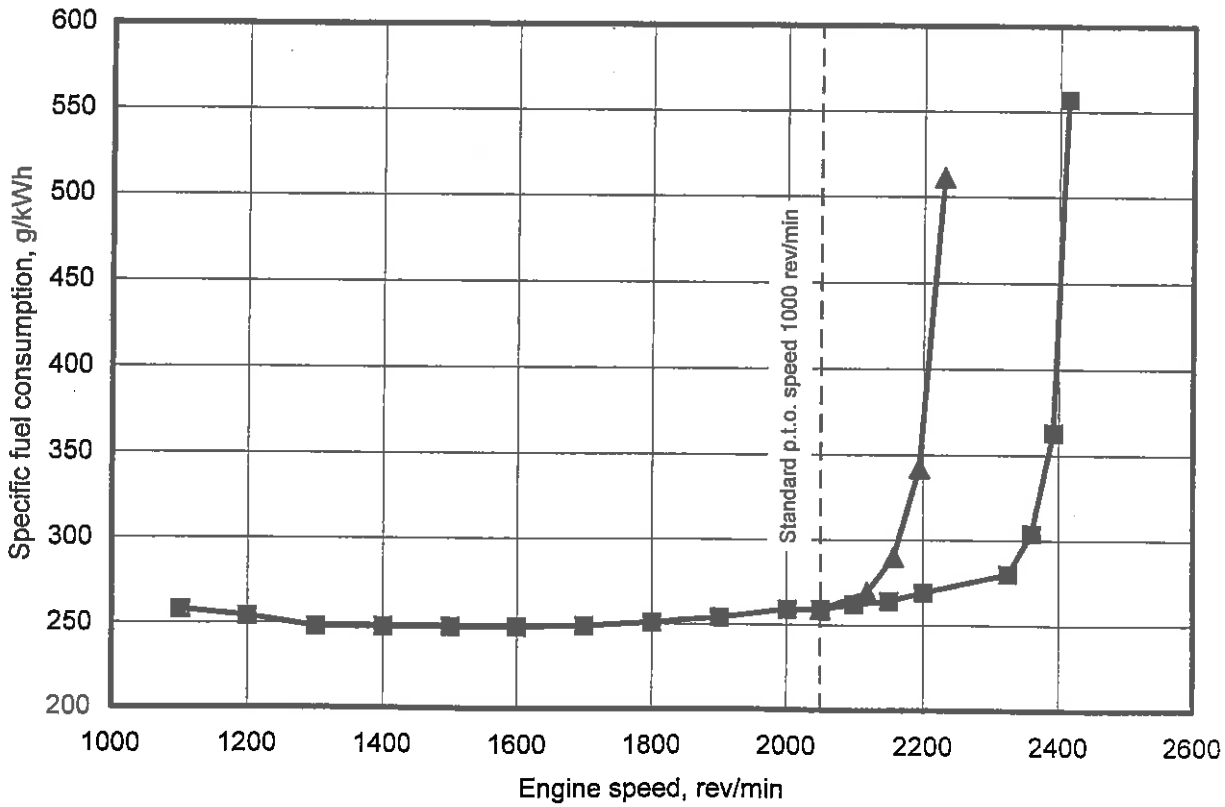
POWER TAKE-OFF TEST



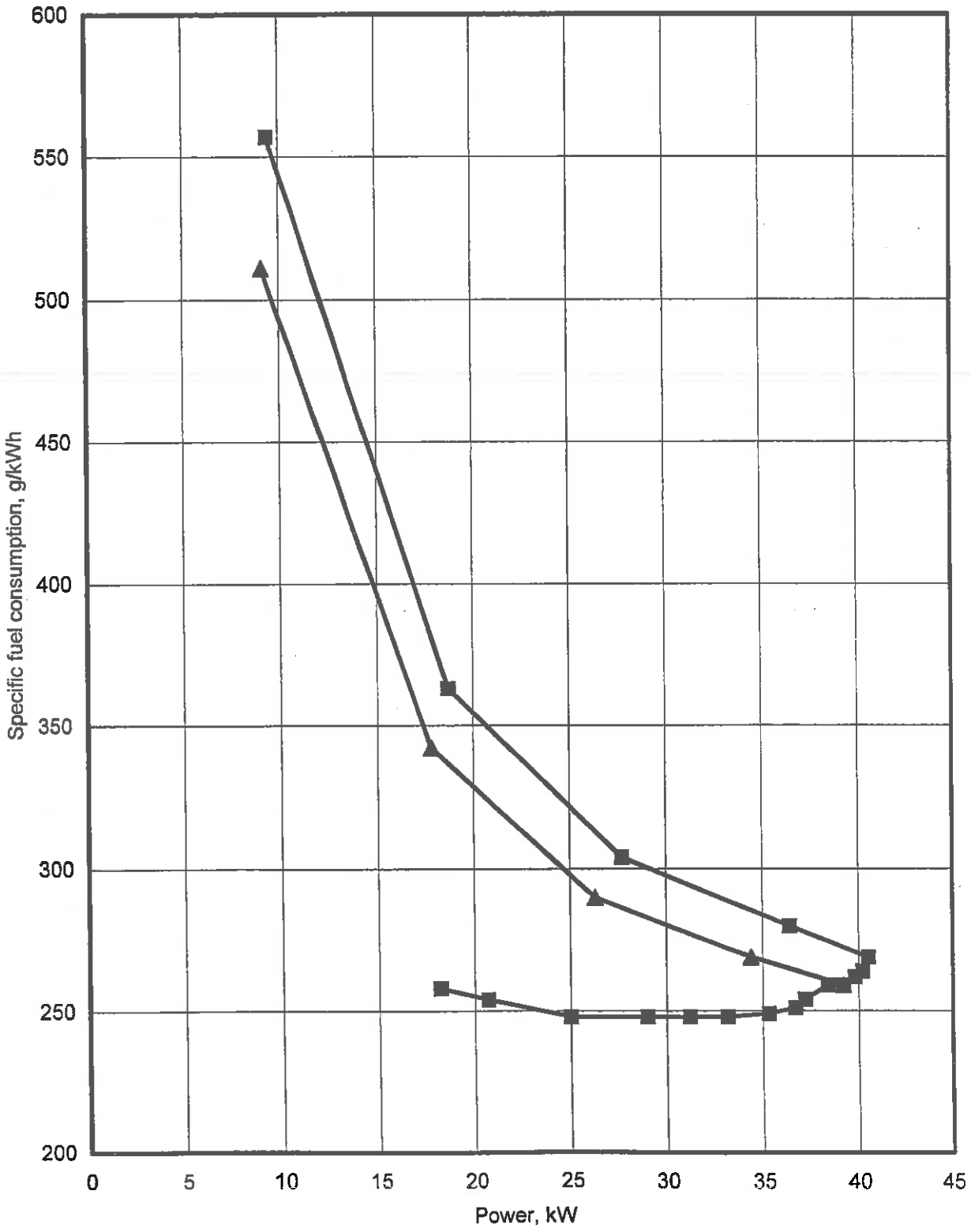


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 6th May 1997

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 18.9 MPa

Pump stalled: No

Pump delivery rate at minimum pressure: 43.0 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	39.0	17.0	11.1
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	39.0	17.0	11.1

Tapping point used for test: External tapping

Temperature of hydraulic fluid: 68 °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 15

	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	695 mm	915 mm
with lifting force	641 mm	873 mm
Maximum corrected force exerted through full range	28.8 kN	19.4 kN
Corresponding pressure of hydraulic fluid	17.0 MPa	17.0 MPa
Moment about rear-wheel axis	27.2 kNm	30.1 kNm
Maximum tilt angle of mast from vertical	-	10 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points													
mm	-530	-500	-407	-400	-300	-200	-100	0	+100	+200	+234	+300	+343
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	-	-	35.5	35.1	34.1	33.1	31.9	30.6	29.8	29.1	28.8	-	-
Corresponding pressure: 17.0 MPa													
Lifting forces at the test frame													
kN	29.9	29.2	-	28.2	27.0	25.6	24.3	23.0	21.7	20.5	-	19.4	19.4
Corresponding pressure: 17.0 MPa													

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 2nd May 1997

Type of track: Bituminous-concrete surface

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
447	160	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)						
3 T	15.4	19.8	2.80	2367	15.0	460
4 T	24.1	19.8	4.39	2314	15.0	384
1 R	30.8	19.8	5.60	2210	15.0	340
5 T	30.1	15.3	7.08	2210	9.6	348
2 R	32.7	14.0	8.41	2199	8.5	319
3 R	32.9	10.6	11.19	2193	6.1	316
4 R	30.8	6.0	18.50	2191	3.3	339
3.3.2 FUEL CONSUMPTION 3.3.2.1 in selected gear, at maximum power at rated speed						
3 R	32.9	10.6	11.19	2193	6.1	316
3.3.2.1.1 75 % of pull at maximum power at rated speed						
3 R	26.3	7.9	11.99	2312	4.6	350
3.3.2.1.2 50 % of pull at maximum power at rated speed						
3 R	18.2	5.3	12.39	2348	2.9	410
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 R	Out of measure					
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 R	18.3	5.3	12.40	1461	2.9	321
3.3.2.2 in selected gear nearest to 7.5 km/h at rated speed						
5 T	30.1	15.3	7.08	2210	9.6	348
3.3.2.2.1 75 % of pull at maximum power at rated speed						
5 T	24.4	11.5	7.64	2313	6.9	379
3.3.2.2.2 50 % of pull at maximum power at rated speed						
5 T	17.0	7.7	7.96	2347	4.2	448
3.3.2.2.3 next higher gear at reduced engine speed; same pull and travelling speed as in 3.3.2.2.1						
2 R	24.2	11.5	7.59	1949	6.9	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						
2 R	17.0	7.7	7.97	1986	4.2	365

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
1.83	29	92	85	12	78	98.7
2.20	27	90	87	13	77	98.7
2.48	27	89	91	14	77	98.7
2.43	30	85	88	17	57	98.7
2.64	26	88	89	16	63	98.7
2.67	28	87	89	17	62	98.7
2.49	30	85	86	17	59	98.7
2.67	28	87	89	17	62	98.7
2.41	30	84	89	18	55	98.6
2.05	32	84	90	18	55	98.6
2.62	33	83	84	19	54	98.6
2.43	30	85	88	17	57	98.7
2.23	31	85	89	17	57	98.7
1.88	30	84	89	17	57	98.7
2.63	31	84	87	18	56	98.6
2.31	31	84	86	18	56	98.6

4. OPTIONAL TESTS RESULTS

4.1 BRAKING

Date of tests: 14th and 15th May 1997

Tractor mass (with driver)

	Front	Rear	Total
	kg	kg	kg
Ballasted tractor	1730	4000	5730
Unballasted tractor	1135	2065	3200

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	32.0	0.115	0.94	42.03
		0.210	1.72	22.97
		0.290	2.48	15.93
		0.430	3.44	11.48
		0.515	3.38	11.69
Unballasted tractor	32.8	0.060	0.71	58.46
		0.095	1.64	25.31
		0.150	2.93	14.17
		0.205	3.20	12.97
		0.215	3.27	12.69

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

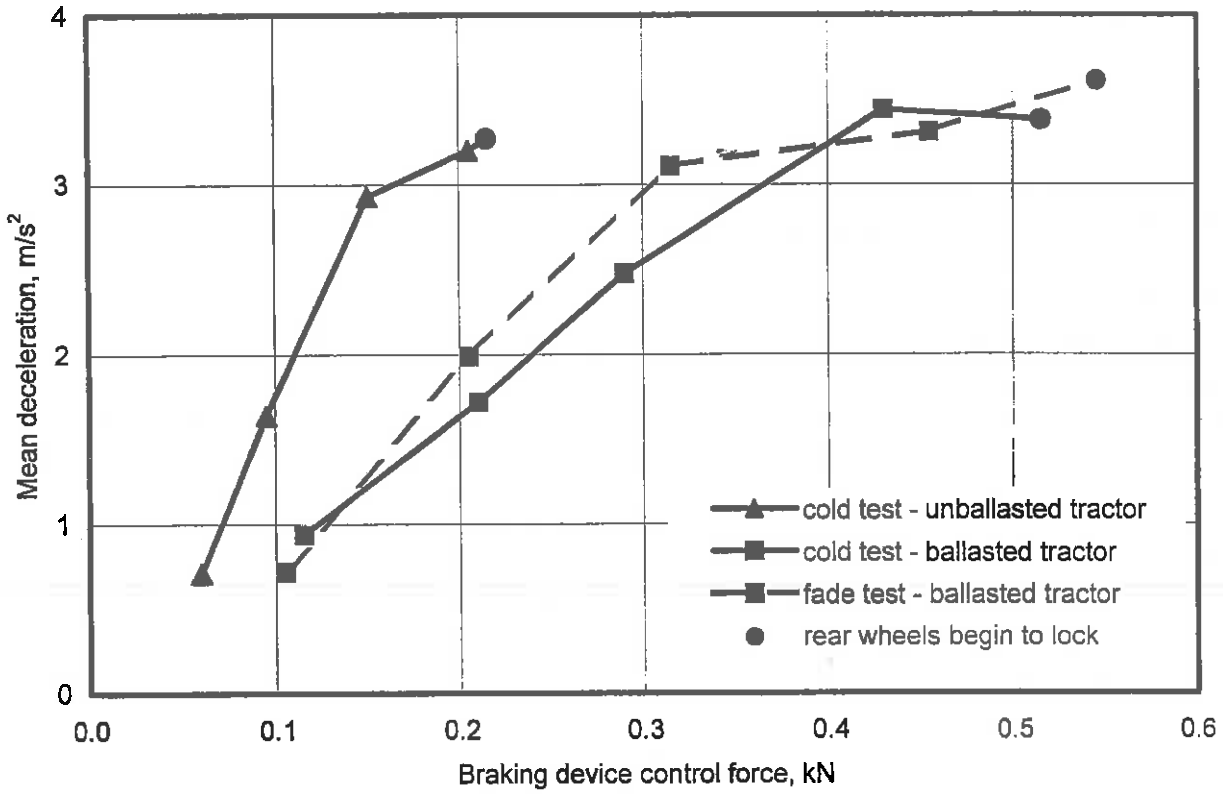
4.1.2 Fade test

	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	32.0	0.105	0.72	54.87
		0.205	1.99	19.85
		0.315	3.11	12.70
		0.455	3.31	11.94
		0.545	3.61	10.94

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
	kN	kN
Braking device control force	0.199	0.204

4.2 MEASUREMENT OF EXTERNAL NOISE

Date of tests: 26th March 1997

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: 5 R

Travelling speed before acceleration: 24.6 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:	5 R
Travelling speed before acceleration:	24.6 km/h
Sound level:	88.0 dB(A)

5. SUPPLEMENTARY TESTS RESULTS

5.1 MAIN POWER TAKE-OFF (modified tractor)

Date and location of tests:	11th April 2001, 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						
40.5	2200	1073	10.79	12.89	266	3.14
5.1.2 POWER AT RATED ENGINE SPEED						
40.5	2200	1073	10.79	12.89	266	3.14
5.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]						
39.8	2050	1000	10.16	12.14	255	3.28
5.1.4 PART LOADS 5.1.4.1 the torque corresponding to maximum power at rated engine speed						
40.5	2200	1073	10.79	12.89	266	3.14
5.1.4.2 85 % of torque obtained in 3.1.4.1						
35.7	2280	1112	9.96	11.90	279	3.00
5.1.4.3 75 % of torque defined in 3.1.4.2						
27.2	2314	1129	8.33	9.95	306	2.73
5.1.4.4 50 % of torque defined in 3.1.4.2						
18.3	2341	1142	6.76	8.08	369	2.26
5.1.4.5 25 % of torque defined in 3.1.4.2						
9.2	2364	1153	5.22	6.24	567	1.47
5.1.4.6 unloaded						
-	2382	1162	3.88	4.64	-	-

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						
39.8	2050	1000	10.16	12.14	255	3.28
5.1.5.2 85 % of torque obtained in 3.1.5.1						
34.7	2101	1025	9.13	10.91	263	3.18
5.1.5.3 75 % of torque defined in 3.1.5.2						
26.4	2134	1041	7.55	9.02	286	2.93
5.1.5.4 50 % of torque defined in 3.1.5.2						
17.9	2165	1056	6.01	7.18	336	2.49
5.1.5.5 25 % of torque defined in 3.1.5.2						
9.0	2191	1069	4.53	5.41	503	1.66
5.1.5.6 unloaded						
-	2212	1079	3.23	3.86	-	-

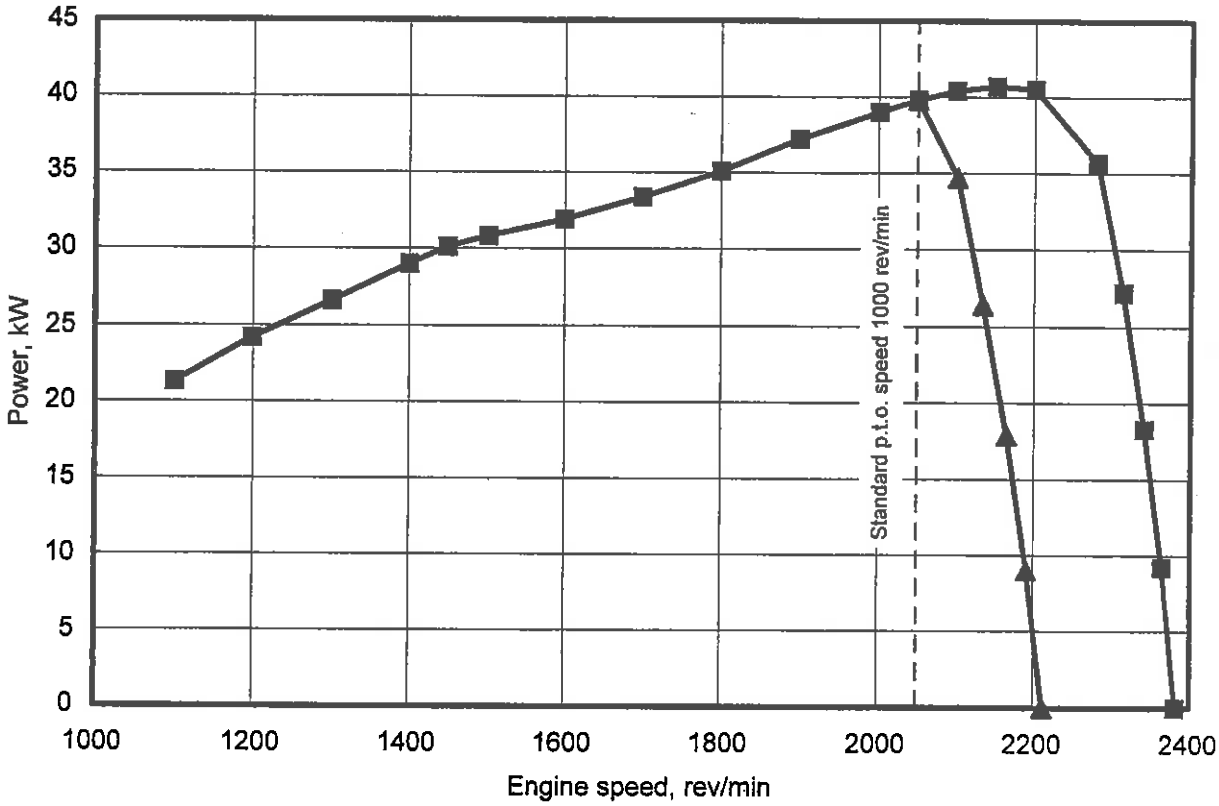
No load maximum engine speed: 2382 rev/min

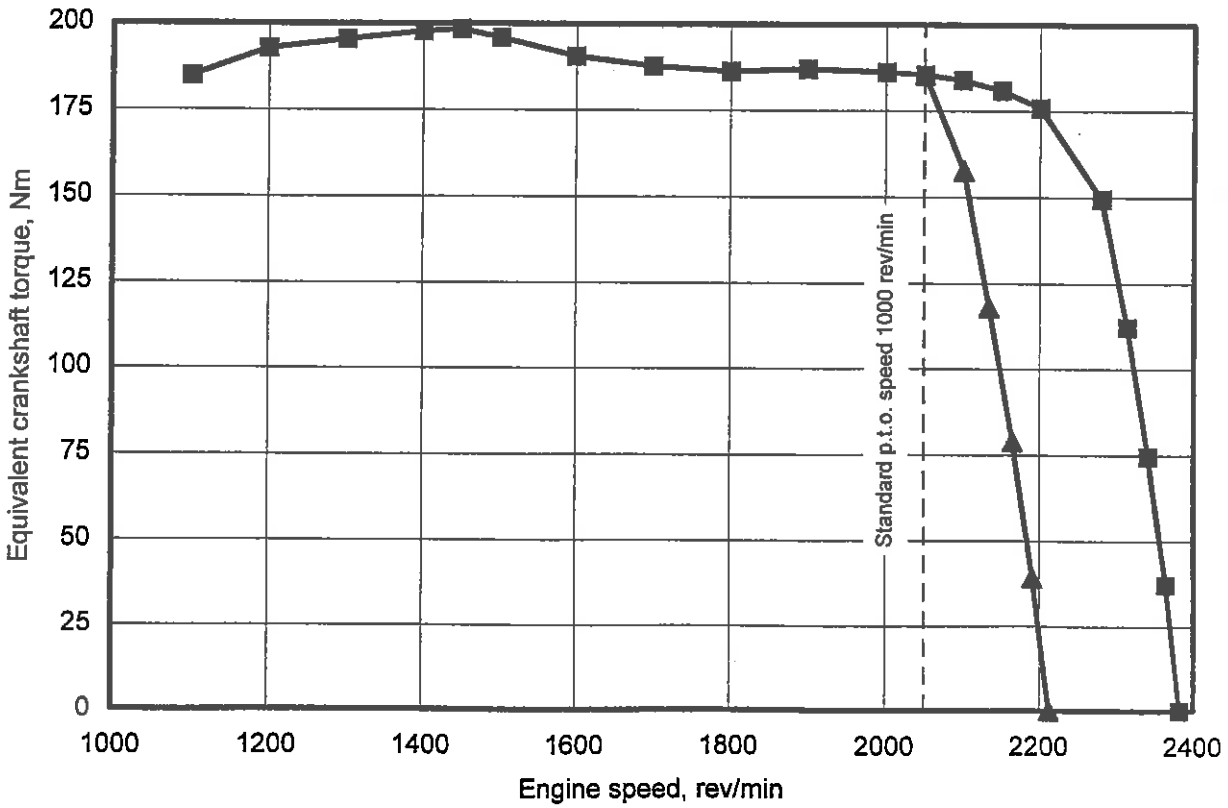
Torque (equivalent crankshaft)
At maximum power: 175.8 Nm
At rated engine speed: 175.8 Nm
At standard power take-off speed: 185.4 Nm

Maximum torque (equivalent crankshaft): 198.4 Nm
(engine speed: 1449 rev/min)

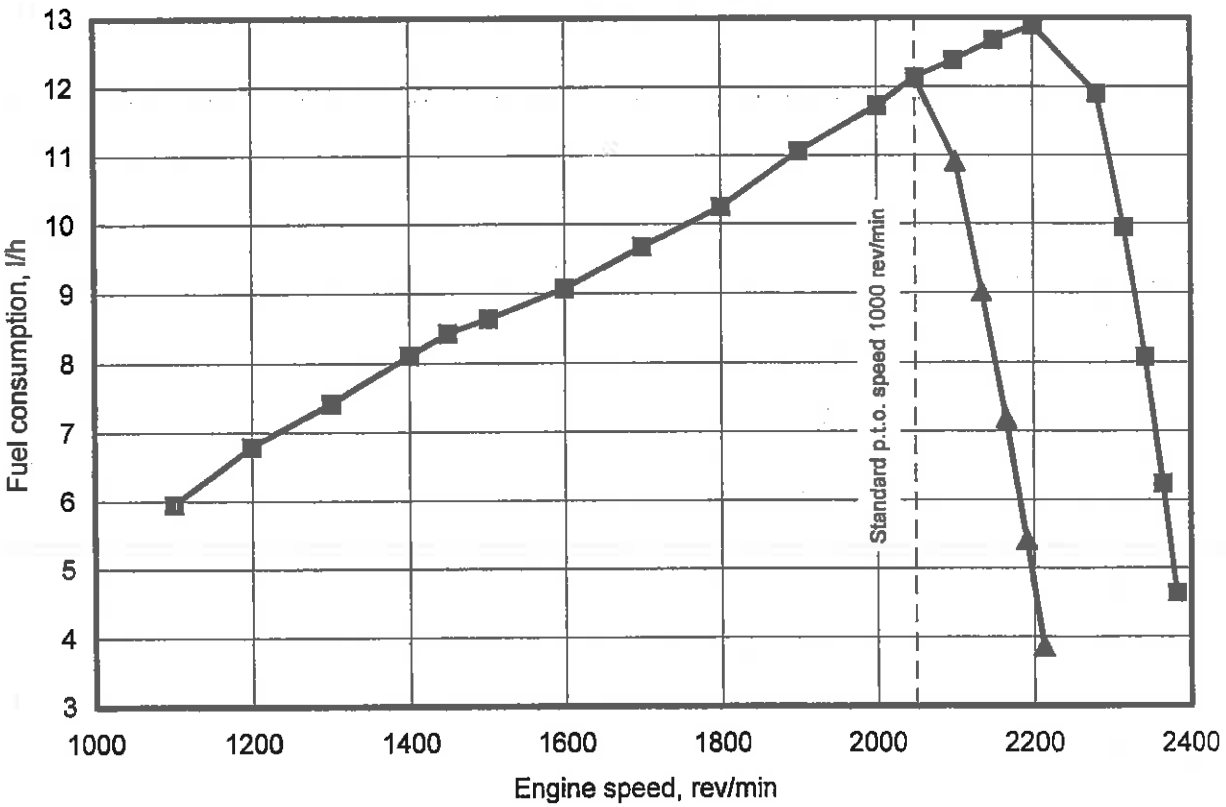
Mean atmospheric conditions:	
Temperature	21 °C
Pressure	96.7 kPa
Relative humidity	31 %
Maximum temperatures:	
Coolant	84 °C
Engine oil	104 °C
Fuel	49 °C
Engine air intake	28 °C

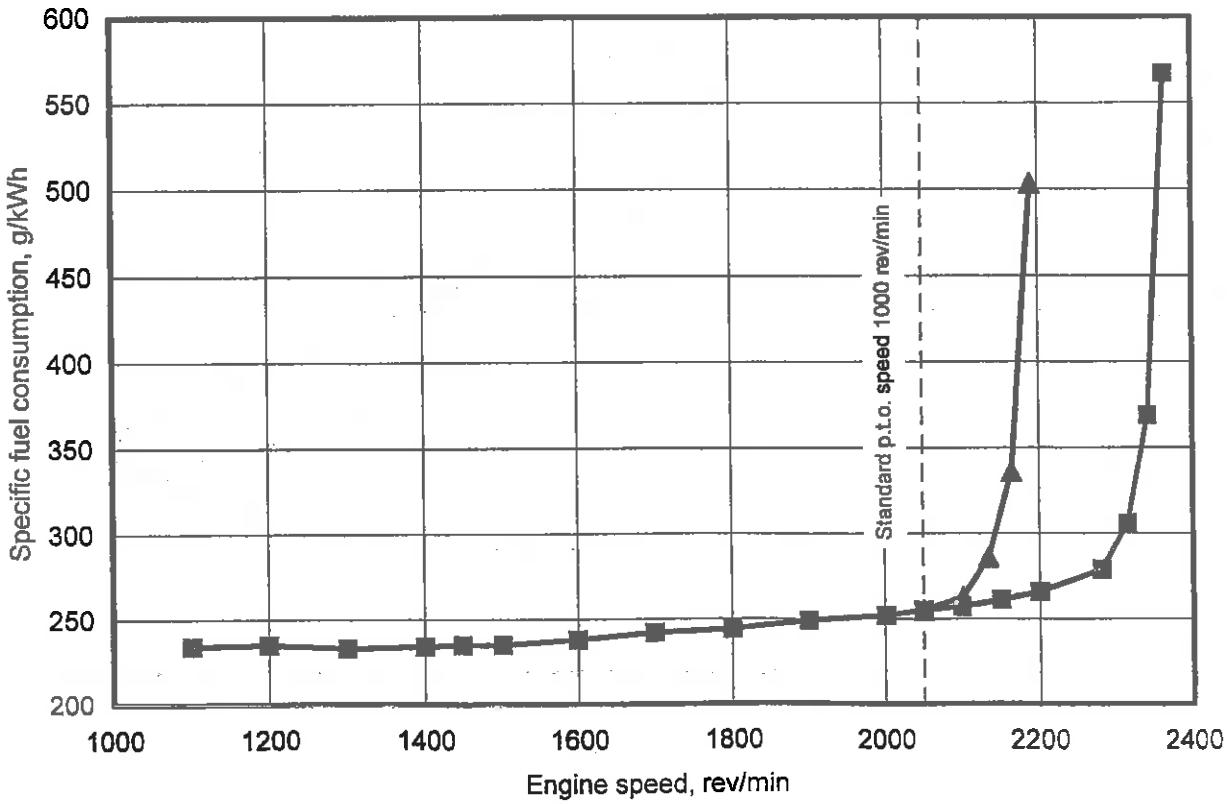
POWER TAKE-OFF TEST



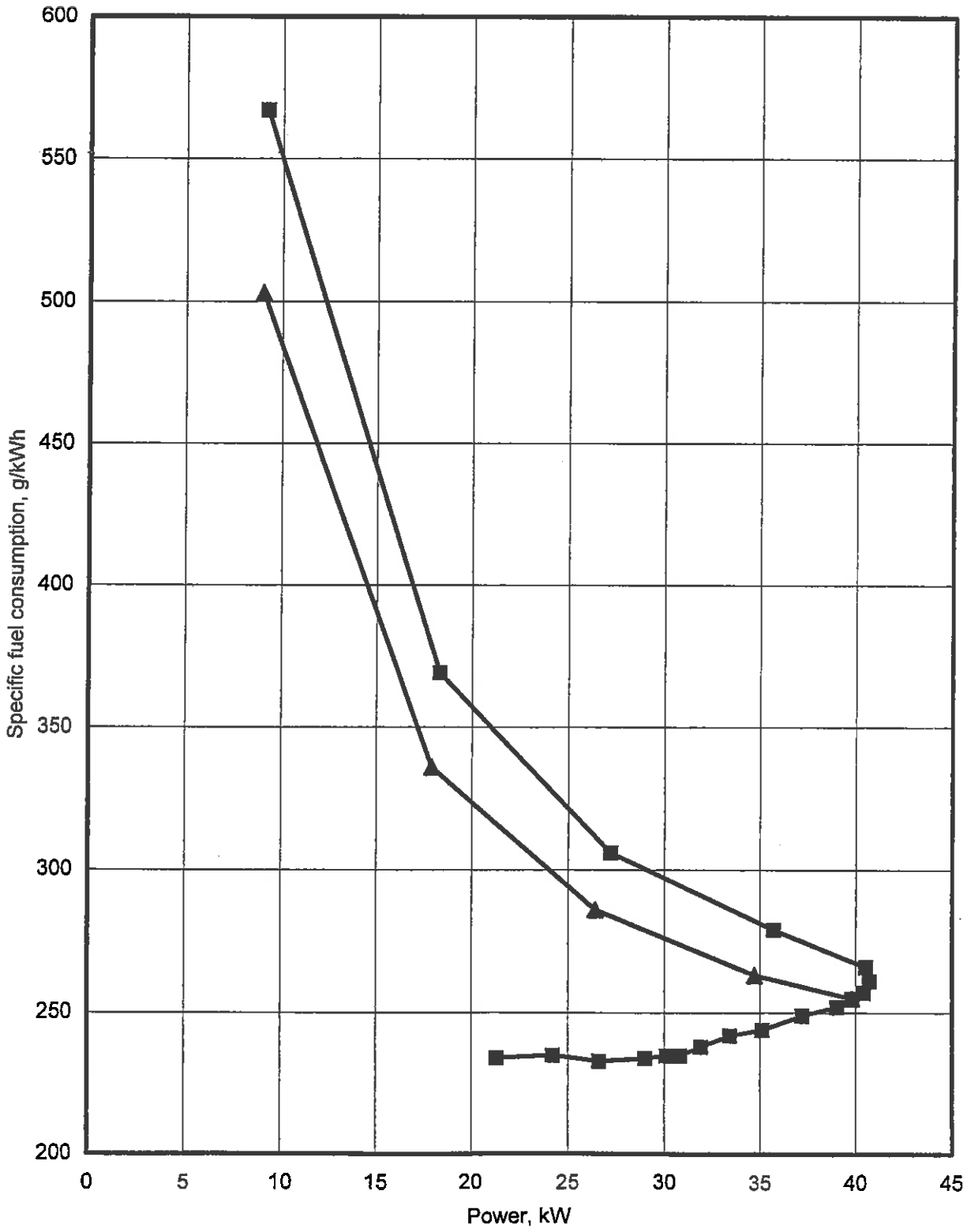


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



6. REPAIRS

None

7. REMARKS

None

Extensions granted by: Dipl. Ing. Peter Pernis

Signed:

Date: 20th April 2001

Head of the Tractor Laboratory

Dipl. Ing. Peter Pernis

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

Director

Dipl. Ing. Vladimír Hanzlík