STÁTNÍ ZKUŠEBNA ZEMĚDĚLSKÝCH, POTRAVINÁŘSKÝCH A LESNICKÝCH STROJŮ

SZZPLS
Třanovského 622/11
CZ-163 04 Praha 6 – Řepy
Czech Republic
Tel.: +420 235 018 111
Fax: +420 235 315 226
E-mail: szzpls@szzpls.cz

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 № 2/2133

Date of approval: 7th June 2004



Agricultural Tractor

ZETOR 64 41 Proxima (4WD) 40 km/h version

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

Report № 24745

Date of test: December 2003 – May 2004

TABLE OF CONTENTS

1. SPECIFICATIONS OF TRACTOR 3
1.1 Identification 3
1.2 Engine 3
1.3 Transmission 5
1.4 Power take-off 10
1.5 Hydraulic power lift 12
1.6 Three-point linkage 13
1.7 Swinging drawbar 14
1.8 Trailer hitch 15
1.9 Holed drawbar 15
1.10 Semi-trailer hitch 15
1.11 Front towing hitch 15
1.12 Steering 16
1.13 Brakes 16
1.14 Wheels 16
1.15 Protective structure 17
1.16 Seat 17
1.17 Lighting 18
2. TEST CONDITIONS 18
2.1 Overall dimensions 18
2.2 Ground clearance 18
2.3 Tractor mass 18
2.4 Tyres and track width specifications 19
2.5 Fuel 19
2.6 Oils and lubrications 19
3. COMPULSORY TESTS RESULTS 21
3.1 Main power take-off 21
3.2 Hydraulic power and lifting force 26
3.3 Drawbar power test 27
4. OPTIONAL TESTS RESULTS 30
4.1 Braking 30
4.2 Measurement of external noise 30
5. REPAIRS 32
6. REMARKS 32

(C[1]) Tractor manufacturer's name and address:	ZETOR a.s., CZ-632 00 Brno, Czech Republic
(D[1]) Location of tractor assembly:	Brno, Czech Republic
(D) Submitted for test by:	The manufacturer
(C) Selected for test by:	The manufacturer with the agreement of the testing station
(D) Place of running-in:	Brno, Czech Republic
(D) Duration of running-in:	104 hours
(C) Location of test:	SZZPLS Praha, Czech Republic

1. SPECIFICATIONS OF TRACTOR

1.1 IDENTIFICATION

(C) Make of the tractor:	ZETOR
(C) Model (trade name):	6441 Proxima
(C) Type:	4WD

1.1.1 Numbers

(D) 1st Serial № or prototype:	N644100304D
(C) Serial №:	N644100304D

1.1.2 Other specifications

(D) Model denomination(s) for other countries:	None
(C) Transmission type or gears × groups × ranges:	5 × 2 × 2
(C) Speed version:	40 km/h
(D) Manufacturer identification of technical type number:	None

1.2 ENGINE

(C) Make:	ZETOR
(C) Model:	7204
(C) Type:	4-stroke diesel engine, direct injection, water cooled, turbocharged
(C) Serial №:	*7204-1001*

1.2.1 Cylinders

(C) Number/disposition:	4, in-line, vertical
(D) Bore/stroke:	105 mm/120 mm
(D) Capacity:	4156 cm³

[1] An item marked "C" indicates that the information declared by the manufacturer has been checked; an item marked "D" that the manufacturer's declaration has been endorsed.

(D) Compression ratio:	17.0:1
(D) Arrangement of valves:	Overhead
(D) Cylinder liners:	Wet, replaceable

1.2.2 Supercharging

(C) Make, model and type:	ČZ, C14 109, exhaust driven
(D) Pressure:	183 kPa
(C) Intercooler:	None

1.2.3 Fuel system

(C) Fuel feed system:	Lift pump piston-type, integral with fuel injection pump
(C) Make, model and type of fuel filter(s):	ATESO, 443 741 111 001, one-stage with paper cartridge
(D) Capacity of fuel tank:	120 dm^3
(C) Make, model and type of injection pump:	MOTORPAL, PP4M10P1f 3420, in-line
(C) Serial №:	TH 4007
Manufacturer's production setting of injection pump	
(C) Flow rate (rated engine speed and full load):	14.07 to 14.55 dm^3/h
(D) Timing:	11° before TDC
(D) Make, model and type of injectors:	MOTORPAL, VA76S160-3028, 4 hole
(D) Injection pressure:	$22.0^{-0.8}$ MPa
(C) Fuel cooler:	None

1.2.4 Governor

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

1.2.5 Air cleaner

Pre-cleaner	
(C) Make, model and type:	Integral with main cleaner, cyclon type
(C) Location of air intake:	Under bonnet forward of radiator
Main cleaner	
(C) Make, model and type:	FILTREL, WGSC1175, dry with paper primary and safety elements, integrated cyclon type pre-cleaner
(C) Maintenance indicator:	Indicator on air cleaner

1.2.6 Lubrication system

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

1.2.7 Cooling system

(C) Type of coolant:	Water and anti-freeze
(D) Type of pump:	Centrifugal, belt driven
Specification of fan or blower:	Axial, belt driven
(C) Number of fan blades:	8
(C) Fan diameter:	460 mm
(D) Coolant capacity:	20.5 dm^3
(C) Type of temperature control:	Thermostat
(D) Superpressure system:	40±10 kPa

1.2.8 Starting system

(C) Make, model and type:	MAGNETON, 443 115 144 763, electrical, solenoid engaged
(D) Starter motor power rating:	3.5 kW
(C) Cold starting aid:	Four electrical glow plugs
(C) Safety device:	Starting operable only when clutch pedal fully depressed and p.t.o. lever in off position

1.2.9 Electrical system

(C) Voltage:	12 V, negative earth
Generator	
(C) Make, model and type:	MAGNETON, 443 113 516 673, alternator, belt driven
(D) Power:	980 W
Battery of accumulators	
(C) Number:	1
(D) Rating:	165 Ah at 20 hours

1.2.10 Exhaust system

(C) Make, model and type:	ZETOR, 15.000.1114, expansion and absorption muffler
(C) Location:	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)

(D) Make, model and type:	ZETOR, 7901 1100, dual dry for travelling and p.t.o.
(D) Number of plates:	2
(D) Diameter of plates:	310 mm for travelling and 280 mm for p.t.o. and torque multiplier
(C) Method of operation:	Hydraulically by pedal

1.3.2 Gear box

(D) Make, model and type:	ZETOR, 54.000.1111, mechanical

Description: Synchromesh gear box with 5 forward and 1 reverse speeds, group gear box with two speed ranges (Lo and Hi) and pneumatically actuated torque multiplier (M and N)

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

(D) Available options: Synchromesh gear box with 6 speeds, group gear box with two speed ranges (Lo and Hi) and reverser (F and R)

	Forward	Reverse
(C) Number of gears	6	6
(C) Number of groups	2	2
(C) Total of arrangements	12	12

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

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

(D) Available options: Gear box with 5 forward and 1 reverse speeds, group gear box with two speed ranges (Lo and Hi)

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

(C) Oil cooler: None

1.3.3 Rear axle and final drives

(D) Make, model and type: ZETOR, 53.161.000, crown wheel and bevel pinion differential and spur gear final drives

Differential lock

(D) Type: Dog clutch, electro-pneumatically activated

(C) Method of engagement: Rocker switch on the dashboard

(C) Method of disengagement: Service brake pedal

1.3.4 Front axle and final drives

(D) Make, model and type: CARRARO, 20.11, crown wheel and bevel pinion differential and planetary final drives

Differential lock

(D) Type: Limited slip

(C) Method of engagement: Self-engaging

(C) Method of disengagement: Self-disengaging

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

Gear №	Group	Range	**(C)** Number of engine revolutions for one revolution of the driving wheels	**(C)** Nominal travelling speed at rated engine speed of 2200 rev/min, km/h (*)
1	Lo	M	409.684	1.51
		N	310.677	1.99
2		M	287.453	2.15
		N	217.985	2.83
3		M	203.419	3.04
		N	154.260	4.01
4		M	128.564	4.81
		N	97.495	6.34
5		M	89.415	6.91
		N	67.806	9.11
1	Hi	M	103.809	5.95
		N	78.722	7.85
2		M	72.837	8.48
		N	55.235	11.19
3		M	51.544	11.99
		N	39.088	15.81
4		M	32.577	18.97
		N	24.704	25.01
5		M	22.657	27.27
		N	17.181	35.96
R	Lo	M	329.424	1.88
		N	249.813	2.47
	Hi	M	83.472	7.40
		N	63.300	9.76
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)				

Lo: Low group, Hi: High group, M: Torque multiplier engaged, N: Normal (Torque multiplier disengaged)

(C) Number of revolutions of front wheels for one revolution of rear-wheels: 1.3540

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

Gear №	Group	**(C)** Number of engine revolutions for one revolution of the driving wheels	**(C)** Nominal travelling speed at rated engine speed of 2200 rev/min, km/h (*)
Forward			
1	Lo	399.701	1.55
2		310.677	1.99
3		217.985	2.83
4		154.260	4.01
5		97.495	6.34
6		67.806	9.11
1	Hi	101.279	6.10
2		78.722	7.85
3		55.235	11.19
4		39.088	15.81
5		24.704	25.01
6		17.181	35.96
Reverse			
1	Lo	365.798	1.69
2		284.325	2.17
3		199.495	3.10
4		141.175	4.38
5		89.225	6.93
6		62.055	9.96
1	Hi	92.689	6.67
2		72.044	8.58
3		50.550	12.22
4		35.772	17.27
5		22.609	27.33
6		15.724	39.30
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)			

Lo: Low group, Hi: High group

(C) Number of revolutions of front wheels for one revolution of rear-wheels: 1.3540

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

Gear №	Group	Range	(C) Number of engine revolutions for one revolution of the driving wheels	(C) Nominal travelling speed at rated engine speed of 2200 rev/min, km/h (*)
1	Lo	C	2881.426	0.21
2			2021.741	0.31
3			1430.708	0.43
4			904.231	0.68
5			628.883	0.98
1	Hi		730.117	0.85
2			512.284	1.21
3			362.524	1.70
4			229.121	2.70
5			159.351	3.88
1	Lo	N	310.677	1.99
2			217.985	2.83
3			154.260	4.01
4			97.495	6.34
5			67.806	9.11
1	Hi		78.722	7.85
2			55.235	11.19
3			39.088	15.81
4			24.704	25.01
5			17.181	35.96
R	Lo	C	2316.936	0.27
	Hi		587.083	1.05
	Lo	N	249.813	2.47
	Hi		63.300	9.76
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)				

Lo: Low group, Hi: High group, C: Creeper engaged, N: Normal (Creeper disengaged)

(C) Number of revolutions of front wheels for one revolution of rear-wheels: 1.3540

1.3.5 Total ratios and travelling speeds (optional – gear box without torque multiplier)

Gear №	Group	**(C)** Number of engine revolutions for one revolution of the driving wheels	**(C)** Nominal travelling speed at rated engine speed of 2200 rev/min, km/h (*)
1	Lo	310.677	1.99
2		217.985	2.83
3		154.260	4.01
4		97.495	6.34
5		67.806	9.11
1	Hi	78.722	7.85
2		55.235	11.19
3		39.088	15.81
4		24.704	25.01
5		17.181	35.96
R	Lo	249.813	2.47
	Hi	63.300	9.76
(*) Calculated with a tyre dynamic radius index of 745 mm (ISO 4251-1:1998)			

Lo: Low group, Hi: High group

(C) Number of revolutions of front wheels for one revolution of rear-wheels: 1.3540

1.4 POWER TAKE-OFF

1.4.1 Main power take-off

(C) Type: Independent

(C) Method of engagement: Pneumatically operated by hand lever or hydraulically by clutch pedal, through second plate in main clutch

(C) Number of shafts: 1 interchangeable shaft, 6 or 21 splines

(C) 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

(C) Location: At rear of tractor

P.T.O. type	**(C)** Diameter of power take-off shaft end	**(C)** Number of splines	**(C)** In conformity with ISO 500:1991
	mm		
540	34.9	6	Yes
540E (*)	34.9	6	No
1000	34.9	21	Yes
(*) On request available instead of p.t.o. type 1000, not fitted to tested tractor			

(C) Height above ground: 752 mm

(C) Distance from the median plane of the tractor: 0 mm

(C) Distance behind rear-wheel axis: 263 mm

P.T.O. type	(C) P.T.O. speed	(C) Engine speed	(C) Ratio of rotation speeds (engine speed/p.t.o. speed)	(D) Power restriction	(D) Maximum torque transmissible
	rev/min	rev/min		kW	Nm
540	540	1994	3.6923	None	None
	596	2200			
540E (*)	750	2109	2.8125	None	None
	782	2200			
1000	1000	2050	2.0500	None	None
	1073	2200			
(*) On request available instead of p.t.o. type 1000, not fitted to tested tractor					

(C) Direction of rotation (viewed from behind tractor): Clockwise

1.4.1.2 Power take-off proportional to ground speed

(C) Indicate p.t.o. and group (*)	(C) Travelling distance for one revolution of power take-off shaft	(C) Number of power take-off shaft revolutions for one revolution of (rear) driving wheels
rev/min	m	
Lo	0.113	41.4373
Hi	0.446	10.4997
(*) Independent of adjusting p.t.o. speed 540 or 1000 rev/min		

(C) 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)

(C) Type: Independent

(C) Method of engagement: Pneumatically operated by hand lever, through dry multiplate clutch

(C) Number of shafts: 1

(C) Method of changing power take-off speeds: None

1.4.2.1 Power take-off proportional to engine speed

(C) Location: At front of tractor

P.T.O. type	(C) Diameter of power take-off shaft end	(C) Number of splines	(C) In conformity with ISO 8759-1:1998
	mm		
1000	34.9	21	Yes

(C) Height above ground: 717 mm

(C) Distance from the median plane of the tractor: 0 mm

(C) Distance in front front-wheel axis: 663 mm

P.T.O. type	**(C)** P.T.O. speed	**(C)** Engine speed	**(C)** Ratio of rotation speeds (engine speed/p.t.o. speed)	**(D)** Power restriction	**(D)** Maximum torque transmissible
	rev/min	rev/min		kW	Nm
1000 (CW)	1000	1952	1.9524	30.0	286.5
	1127	2200			
1000 (CCW)	1000	1955	1.9545		
	1126	2200			

(C) Direction of rotation (viewed from face tractor): Clockwise or counterclockwise (alternative mounting)

1.4.2.2 Power take-off proportional to ground speed None

1.5 HYDRAULIC POWER LIFT

(C) Make, model and type: ZETOR, 53.940.039, hydraulic with mechanical position, draft or mixed control, top link sensing

(C) Type of hydraulic system: Open centre

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

(C) Type of linkage lock for transport: Hydraulic

(D) Relief valve pressure setting (tolerance): $18.0^{+0.2}$ MPa

(D) Opening pressure of cylinder safety valve: $21.0^{+2.0}$ MPa

(D) Lift pump type: Gear pump

(D) Transmission between pump and engine: Gear driven from engine

(C) Type and number of filters: 1 full flow with replaceable paper element

(C) Site of oil reservoir: Transmission housing

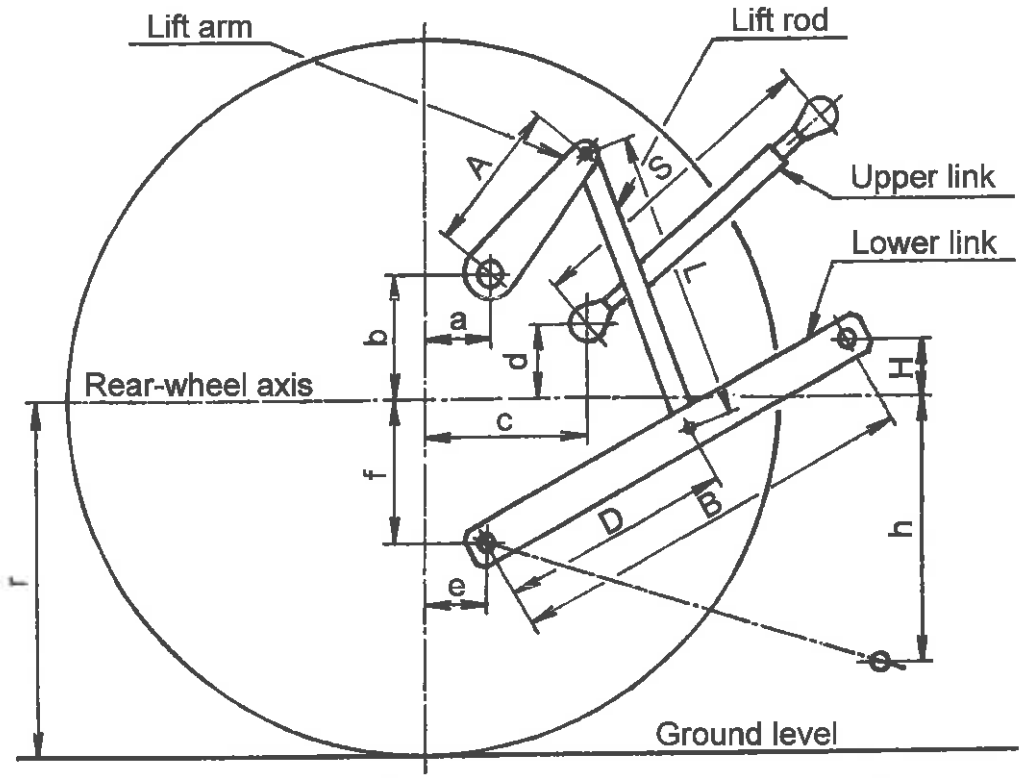
(C) Type, number and location of tapping points: ISO standard couplings 12.5 mm, 1 double acting control valves, 2 pressure and 1 return couplings at rear of tractor

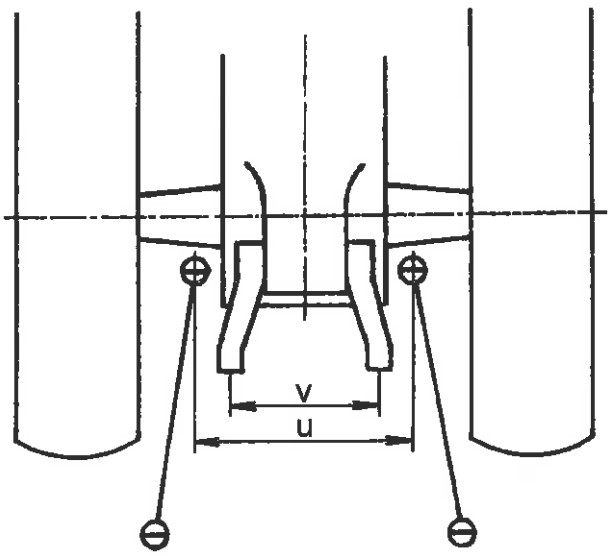
(D) Maximum volume of oil available to external cylinders: 20 dm^3

1.6 THREE-POINT LINKAGE

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

(C) Category adapter: None





Linkage geometry dimensions:

			Dimension or range	Settings used in test
			mm	mm
(C) Length of lift arms:		(A)	320	320
(C) Length of lower links:		(B)	857	857
(C) Distance of lift arm pivot point from rear-wheel axis:	horizontally: vertically:	(a) (b)	30 362	30 362
(C) Horizontal distance between the 2 lower link points:		(u)	450	450
(C) Horizontal distance between the 2 lift arm end points:		(v)	639	639
(C) Length of upper link:		(S)	590 to 770	708
(C) Distance of upper link pivot point from rear-wheel axis:	horizontally: vertically:	(c) (d)	288 182, 229, 276, 323	288 229
(C) Distance of lower link pivot point from rear-wheel axis:	horizontally: vertically:	(e) (f)	83 138	83 138
(C) Distance of lower link pivot points to lift rod pivot points on lower links:		(D)	399	399
(C) Length of lift rods:		(L)	452 to 571	542
(C) Height of lower hitch points relative to the rear-wheel axis:	in low position: in high position:	(h) (H)	252 to 575 121 to 372	545 187
(C) 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

(C) Type: Clevis

Height above ground
- **(C)** Maximum: 447 mm
- **(C)** Minimum: 447 mm

(C) Type of adjustment: None

(C) Distance of hitch point from rear-wheel axis, horizontally: 652 and 658 mm

Distance of hitch point from power take-off shaft end
- **(C)** Vertically: 305 mm
- **(C)** Horizontally: 389 and 395 mm

Lateral adjustment (centre of clevis)
- **(C)** Right-hand: 80 mm
- **(C)** Left-hand: 80 mm

(C) Distance of pivot point from rear-wheel axis, horizontally: 91 mm to rear

(C) Diameter of drawbar pin hole: 31 mm

(D) Maximum vertical permissible load:	12 kN

1.8 TRAILER HITCH

(C) Type:	Automatic clevis
(C) Hole diameter:	35 mm
(C) Height above ground:	752, 802, 852, 902 and 952 mm
(C) Distance of hitch point from rear-wheel axis, horizontally:	628 mm
Distance of hitch point from power take-off shaft end	
(C) Vertically:	0, 50, 100, 150 and 200 mm
(C) Horizontally:	365 mm
(D) Maximum vertical permissible load:	10 kN

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

(C) Number of holes:	9
(C) Distance between holes:	80 mm
(C) Hole diameter:	27 mm
(C) Thickness/width of the drawbar:	30 mm/80 mm
Height above ground	
(C) Maximum:	932 mm
(C) Minimum:	200 mm
(C) Horizontal distance to power take-off shaft end (rear):	677 mm

1.10 SEMI-TRAILER HITCH

(C) Type:	Towing hook
(C) Hole diameter:	47 mm
(C) Height above ground:	512 mm
(C) Distance of hitch point from rear-wheel axis, horizontally:	368 mm
Distance of hitch point from power take-off shaft end	
(C) Vertically:	240 mm
(C) Horizontally:	105 mm
(D) Maximum vertical permissible load:	17 kN

1.11 FRONT TOWING HITCH

(C) Height above ground:	742 mm
(C) Diameter of pin hole:	31 mm

1.12 STEERING

(D) Make, model and type:	SAUER-DANFOSS, OSPC 100 ON (fitted to tested tractor) or RCD CALZONI, GIVI ON 100G 125 or ZF, LAGC 100-1712-2, hydrostatic
Method of operation:	Independent hydraulic circuit for steering
(D) Pump(s):	Gear pump, driven from engine
(D) Ram(s):	Double-acting cylinder on the front axle, simmetrical design
(D) Working pressure:	12.5 MPa

1.13 BRAKES

1.13.1 Service brake

Rear axle

(D) Make, model and type:	ZETOR, 63.267.000, wet disc, multiplate, 4 discs on each side
(C) Method of operation:	Hydraulically by pedals, coupled or independent

Front axle

(D) Make, model and type:	CARRARO, 20.11, wet disc, 2 discs on each side
(C) Method of operation:	Hydraulically with air brake booster by coupled pedals
(C) Trailer braking take-off:	Combined one line and two line air braking system and hydraulic braking system, actuated by tractor pedals

1.13.2 Parking brake

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

1.14 WHEELS

Number

(C) Front:	2, steering and driving
(C) Rear:	2, driving
(C) Wheelbase:	2237 mm

Track width adjustment:

	Minimum	Maximum	Adjustment method
	mm	mm	
(D) Front	1585	1810	Reversing wheels and off-set lug rims
(D) Rear	1420	1795	Reversing wheels and off-set lug rims

1.15 PROTECTIVE STRUCTURE

(C) Make, model and type:	ZETOR, UBK 7341, cab with integrated safety frame
(C) Manufacturer's name and address:	ZETOR a.s., CZ-632 00 Brno, Czech Republic
Protective device	
(C) Cab/frame/rollguard/other:	Cab
(C) Tiltable/not tiltable:	Not tiltable
OECD approval	
(C) Approval number:	4/0404/1
(C) Date of approval:	10th March 2004
(C) Nos. of minor modification certificates, if any:	None

1.16 SEAT

1.16.1 Driver's seat

(C) Make, model and type:	GRAMMER, DS 85H1/90A, upholstered seat with back rest and arm rests
(C) Seat and steering wheel reversible:	No
(C) Type of suspension:	Parallelogram linkage adjustable for driver's weight
(C) Type of damping:	Hydraulic
Range of adjustment	
(C) Longitudinally:	150 mm
(C) Vertically:	60 mm
(C) Safety belt:	Yes
Type:	Lap belt with retractor

1.16.2 Optional driver's seat(s)

(D) Make	**(D)** Model	**(D)** Type of suspension	**(D)** Type of damping	**(D)** Range of adjustment	
				Longitudinally	Vertically
				mm	mm
GRAMMER	DS 85H/3A	Mechanic	Hydraulic	150	60
MARS	Zetor 7211 5400	Mechanic	Hydraulic	150	60

(D) Type:	Upholstered seat with back rest and arm rests
(D) Safety belt:	Yes
Type:	Lap belt

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
(C) Headlights	1225	145×80	200
(C) Sidelights	1525	60×65	810
(C) Rearlights	1695	140×40	815
(C) Reflectors	1160	Ø78	770

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
3910	1990	2250	2675	2730

2.2 GROUND CLEARANCE (unballasted tractor): 435 mm

Clearance-limiting part: Swinging drawbar bracket

2.3 TRACTOR MASS

Mass (with cab):

	Without driver	With driver
	kg	kg
Front	1520	1535
Rear	2175	2235
Total	3695	3770

2.4 TYRES AND TRACK WIDTH SPECIFICATIONS

	Front	Rear
Tyres:		
Make	BARUM	BARUM
Model	TZR 2	TZR 2
Dimensions	13.6 R 24	16.9 R 34
Ply rating	121 A8	139 A8
Type	Radial	Radial
Maximum load (tyre manufacturer's)	14.50 kN	24.30 kN
Maximum load (tractor manufacturer's)	10.00 kN	17.00 kN
Inflation pressure (tyre manufacturer's)	160 kPa	160 kPa
Dynamic radius index	560 mm	745 mm
Chosen track width:	1585 mm	1495 mm

2.5 FUEL

Type:	Diesel fuel, in conformity with national standard ČSN EN 590
Density at 15 °C:	0.841 g/cm³ for p.t.o. tests 0.842 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	300	300
Gear box	64.0	1200	600
Front axle	5.5	1200	-
Rear axle		Common with gear box	
Final drive (front)	2×1.7	1200	-
Final drive (rear)	2×1.9	1200	-
Hydraulic system		Common with gear box	
Steering	2.5	1200	1200

2.6.2 Specifications (SAE, API, CCMC, ACEA, Mil.L, ISO)

	Recommended	Used during test
Engine oil: Type Viscosity Classification	ARAL Multi Turboral SAE 15W-40 14.4 mm²/s at 100 °C API CF-4/SG	As recommended
Transmission oils: Type Viscosity Classification	ARAL EP SAE 80W 9.6 mm²/s at 100 °C API GL-4	As recommended
Steering oil: Type Viscosity Classification	ARAL Vitam DE 32 HLP-D 32.0 mm²/s at 40 °C ISO 6743-L-HM32	As recommended

Hydraulic fluid: Same as transmission

2.6.3 Grease

Number of lubrication points: 24

3. COMPULSORY TESTS RESULTS

3.1 MAIN POWER TAKE-OFF

Date and location of tests: 2nd December 2003, SZZPLS Praha

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

Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	rev/min	rev/min	rev/min	kg/h	l/h	g/kWh	kWh/l
3.1.1 MAXIMUM POWER – TWO-HOUR TEST							
41.9	1800	878	2334	10.64	12.65	254	3.31
3.1.2 POWER AT RATED ENGINE SPEED							
39.8	2200	1073	2843	11.91	14.16	299	2.81
3.1.3 STANDARD POWER TAKE-OFF SPEED [1000±25 rev/min]							
40.4	2050	1000	2653	11.25	13.38	278	3.02
3.1.4 PART LOADS 3.1.4.1 The torque corresponding to maximum power at rated engine speed							
39.8	2200	1073	2843	11.91	14.16	299	2.81
3.1.4.2 85 % of torque obtained in 3.1.4.1							
35.2	2290	1117	2964	11.23	13.35	319	2.64
3.1.4.3 75 % of torque defined in 3.1.4.2							
26.8	2325	1134	3006	9.79	11.64	365	2.30
3.1.4.4 50 % of torque defined in 3.1.4.2							
18.1	2347	1145	3037	8.44	10.04	466	1.80
3.1.4.5 25 % of torque defined in 3.1.4.2							
9.1	2370	1156	3065	6.82	8.11	749	1.12
3.1.4.6 Unloaded							
-	2388	1165	3091	5.44	6.47	-	-

Power	Speed			Fuel consumption			Specific energy
	Engine	P.T.O.	Fan	Hourly		Specific	
kW	rev/min	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							
40.4	2050	1000	2653	11.25	13.38	278	3.02
3.1.5.2 85 % of torque obtained in 3.1.5.1							
35.8	2138	1043	2769	10.55	12.54	295	2.85
3.1.5.3 75 % of torque defined in 3.1.5.2							
27.3	2175	1061	2812	9.08	10.80	333	2.53
3.1.5.4 50 % of torque defined in 3.1.5.2							
18.5	2210	1078	2863	7.71	9.17	417	2.02
3.1.5.5 25 % of torque defined in 3.1.5.2							
9.3	2232	1089	2890	6.06	7.21	652	1.29
3.1.5.6 Unloaded							
-	2257	1101	2920	4.69	5.58	-	-

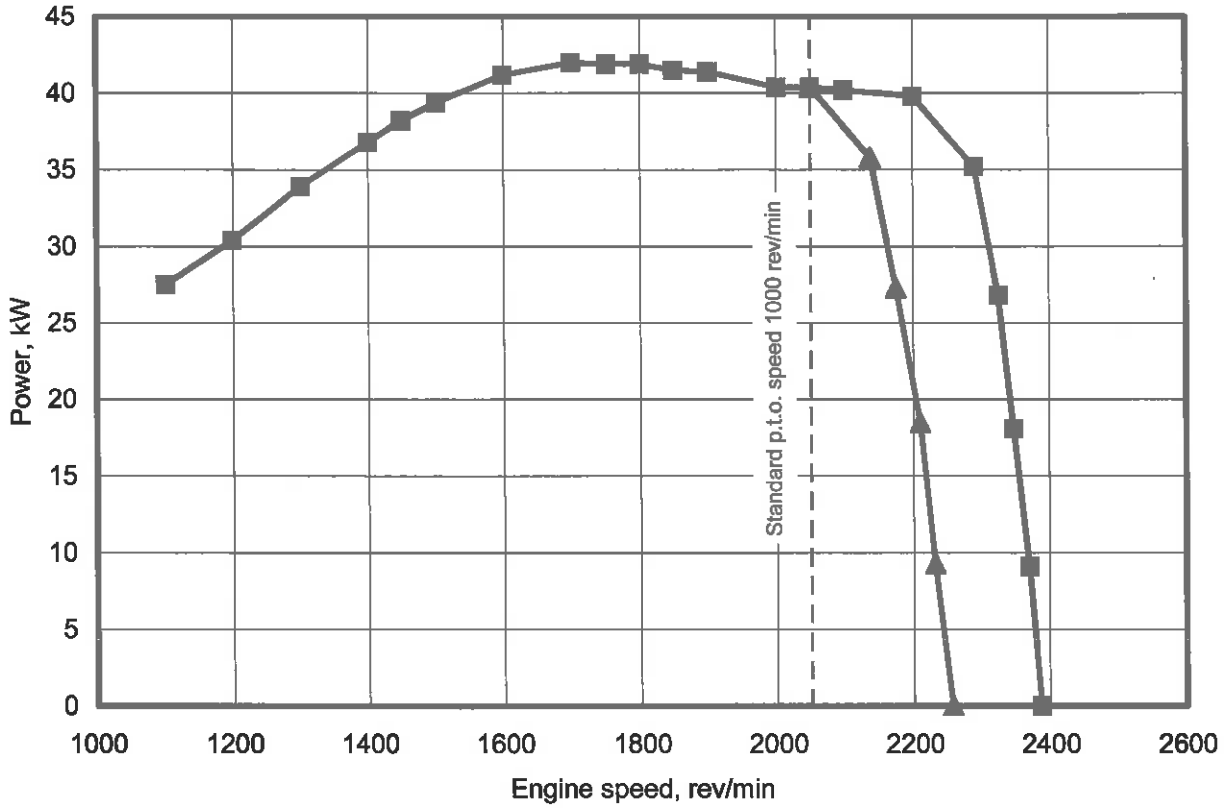
No load maximum engine speed: 2388 rev/min

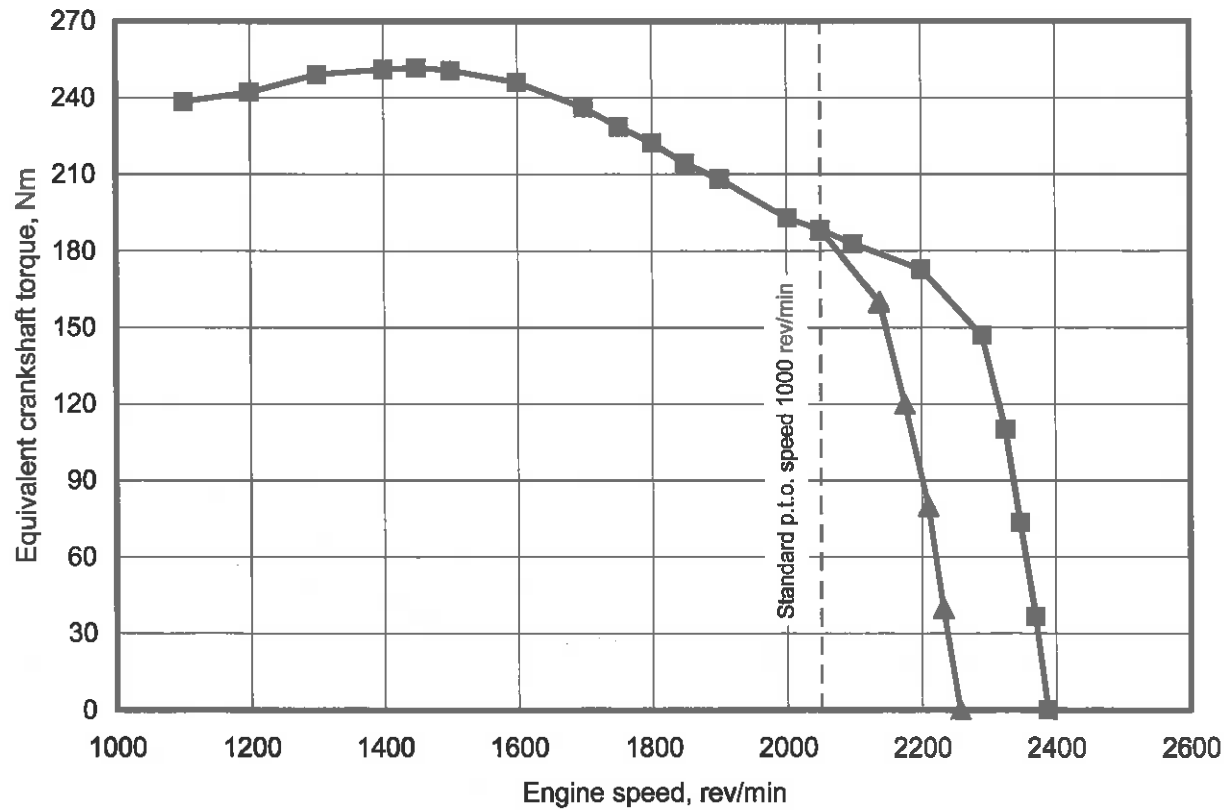
Torque (equivalent crankshaft)
At maximum power: 222.3 Nm
At rated engine speed: 172.8 Nm
At standard power take-off speed: 188.2 Nm

Maximum torque (equivalent crankshaft): 251.7 Nm
(engine speed: 1449 rev/min)

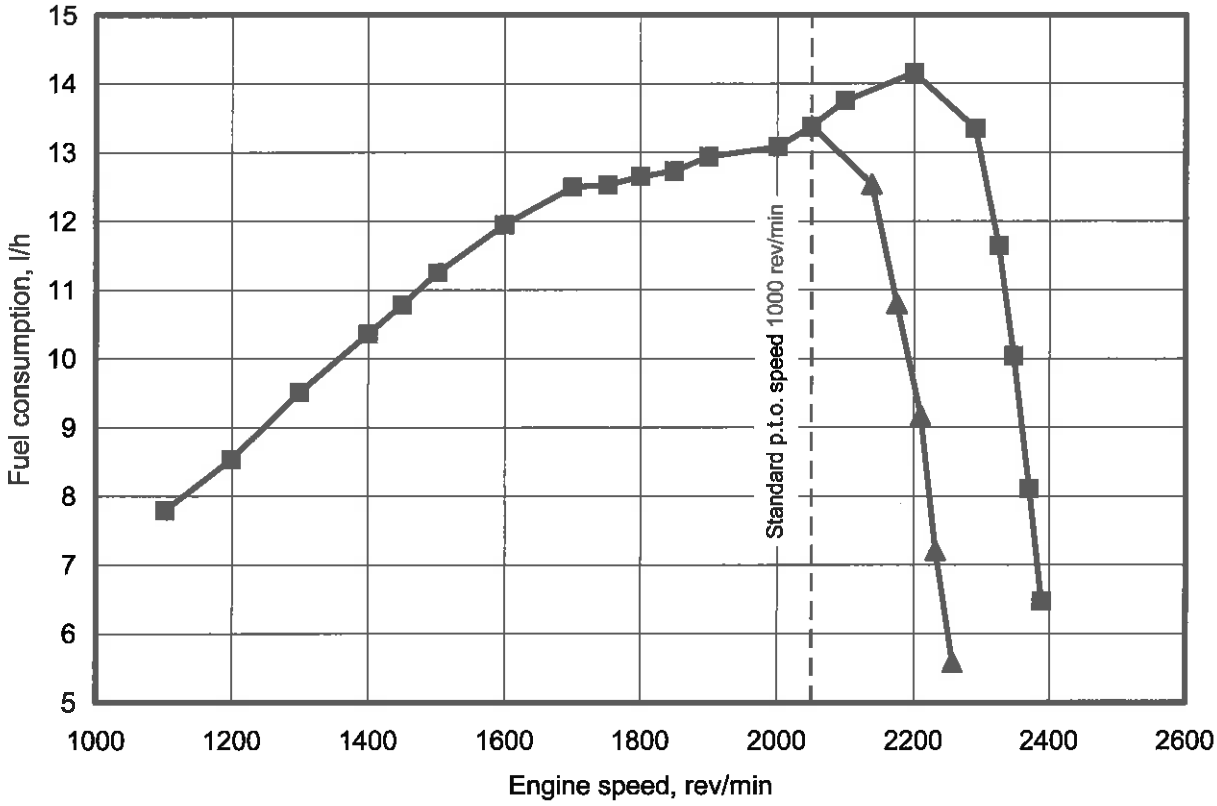
Mean atmospheric conditions:	
Temperature	19 °C
Pressure	97.0 kPa
Relative humidity	40 %
Maximum temperatures:	
Coolant	81 °C
Engine oil	103 °C
Fuel	40 °C
Engine air intake	25 °C

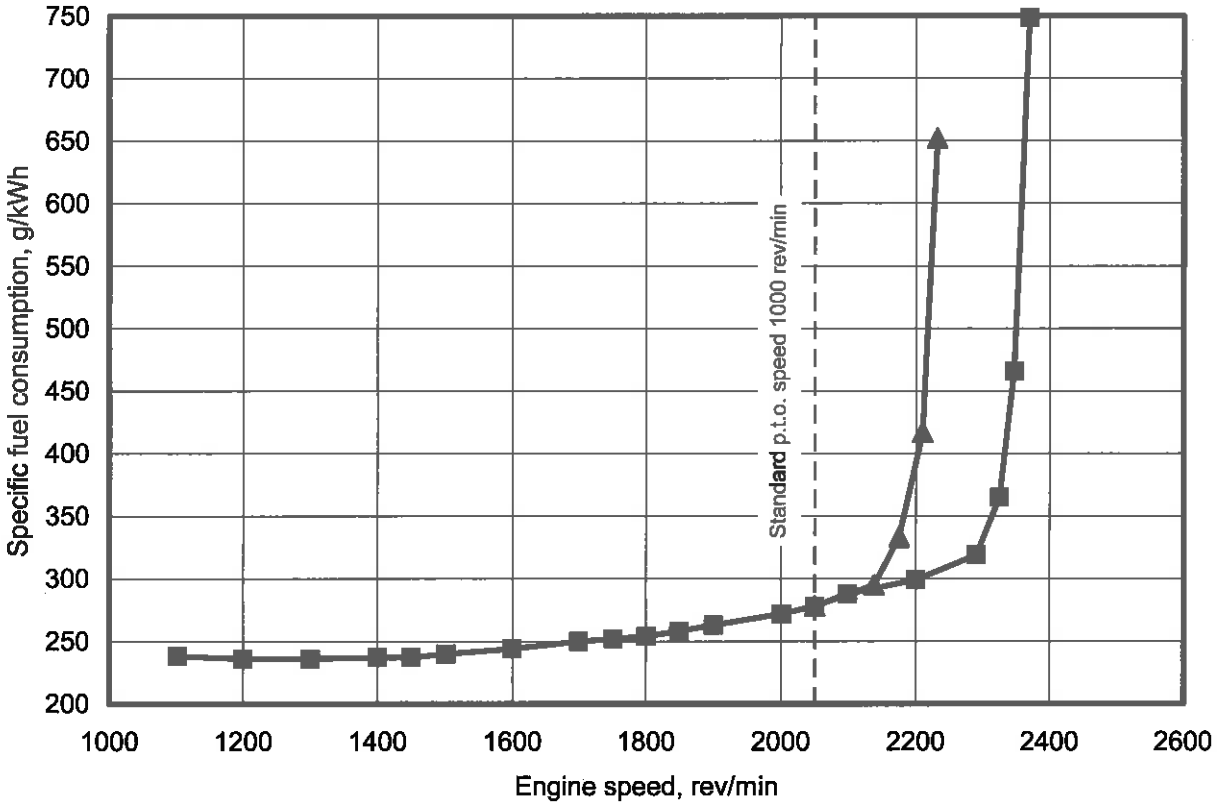
POWER TAKE-OFF TEST



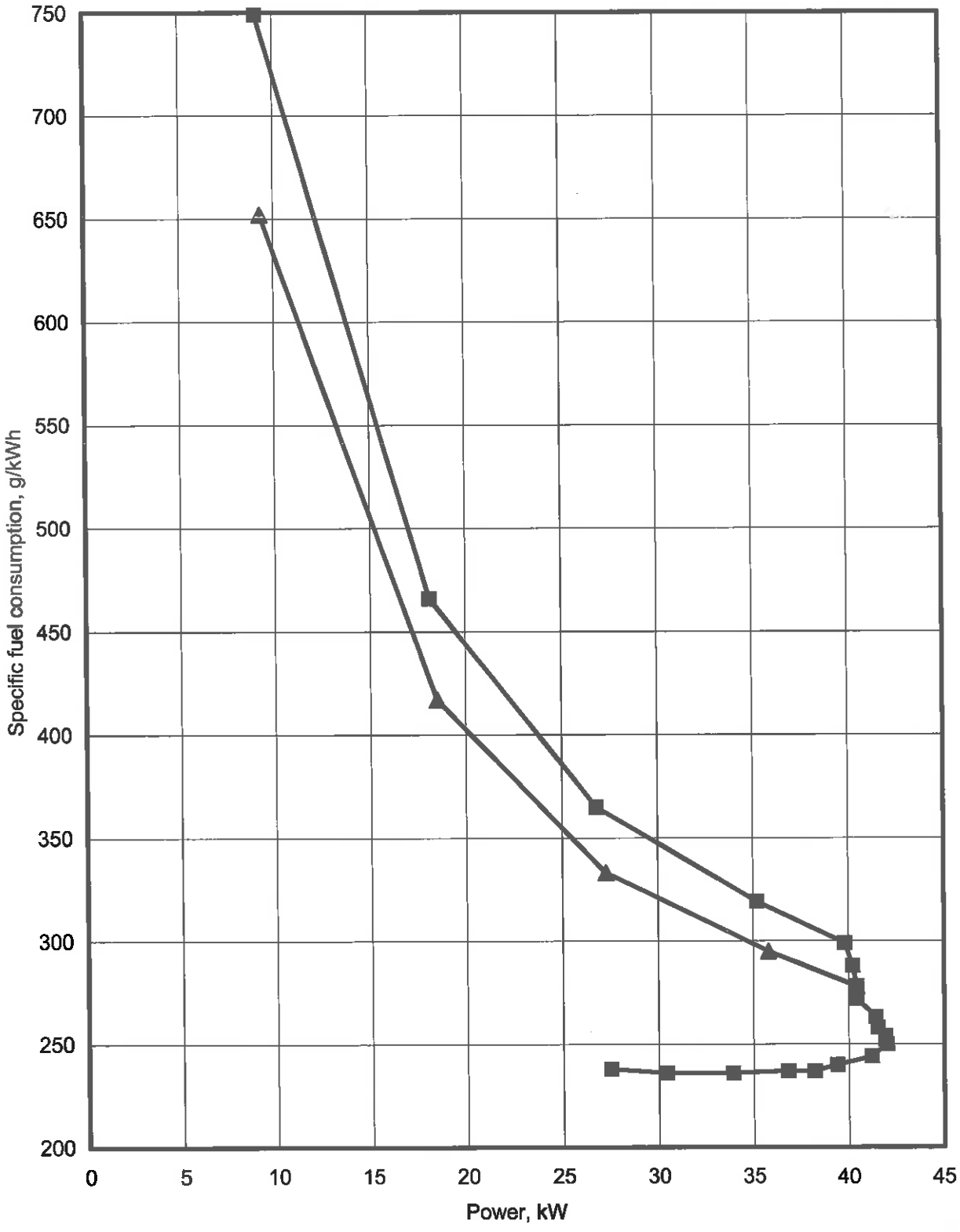


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST



3.2 HYDRAULIC POWER AND LIFTING FORCE

Date of tests: 5th May 2004

3.2.1 Hydraulic power test

3.2.1.1 Hydraulic fluid data

Hydraulic fluid type: ARAL EP 80W

Viscosity index (ISO 3448 + Cor.1:1993): 105

Viscosity at 100 °C: 9.6 mm²/s

3.2.1.2 Compulsory reporting (test results)

Pressure	Reservoir oil temperature		Engine speed	Flow rate	Power
	Min.	Max.			
MPa	°C	°C	rev/min	l/min	kW
Rated engine speed (manufacturer specification)					
			2200		
3.2.1.2.1 Maximum (sustained) pressure with relief valve open as measured at the coupler Pump stalled: No					
18.6	61	61	2367		
3.2.1.2.2 Flow rate corresponding to a hydraulic pressure equivalent to 90 % of the actual relief valve pressure setting and corresponding hydraulic power					
16.7	68		2367	46.3	12.9
3.2.1.2.3 Maximum available flow and maximum power from one coupler pair					
17.6	68		2360	45.8	13.4
3.2.1.2.4 Maximum available flow and maximum power from coupler pair operating simultaneously (flow through two or more coupler pair if required)					
Not applicable					

3.2.1.3 Supplementary reporting (test results) None

3.2.2 Power lift test

Linkage setting for test – see table on page 14

	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	732 mm	961 mm
with lifting force	669 mm	888 mm
Maximum corrected force exerted through full range	34.8 kN	22.7 kN
Corresponding pressure of hydraulic fluid	16.7 MPa	16.7 MPa
Moment about rear-wheel axis	32.7 kNm	35.2 kNm
Maximum tilt angle of mast from vertical	-	12 degrees

Lifting heights relative to the horizontal plane including the lower link pivot points													
mm	-518	-500	-407	-400	-300	-200	-100	0	+100	+200	+262	+300	+370
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	-	-	45.7	46.2	43.6	41.6	39.7	38.2	36.6	35.3	34.8	-	-
Corresponding pressure: 16.7 MPa													
Lifting forces at the test frame													
kN	38.6	37.4	-	35.4	33.4	31.6	30.1	28.4	26.7	25.2	-	23.9	22.7
Corresponding pressure: 16.7 MPa													

3.3 DRAWBAR POWER TEST (unballasted tractor)

Date of tests: 1st April 2004

Type of track: Bituminous-concrete surface

Height of drawbar above ground	Tyre inflation pressure	
	Front	Rear
mm	kPa	kPa
447	100	90

Gear number and	Power	Drawbar pull	Speed	Speed		Slip of wheels	Specific fuel consumption
				Engine	Fan		
	kW	kN	km/h	rev/min	rev/min	%	g/kWh
3.3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)							
2 Lo N	24.1	34.3	2.53	2300	2977	14.7	453
3 Lo M	25.4	33.8	2.70	2292	2967	14.8	441
3 Lo N	30.7	30.1	3.67	2200	2848	8.4	386
4 Lo M	31.9	32.8	3.50	1800	2330	11.0	334
1 Hi M	34.6	27.4	4.55	1800	2330	6.6	312
4 Lo N	33.6	24.7	4.90	1800	2330	5.6	310
5 Lo M	33.5	22.4	5.39	1803	2334	4.8	316
1 Hi N	34.8	20.3	6.18	1804	2335	4.1	298
2 Hi M	34.6	18.7	6.67	1800	2330	3.9	301
5 Lo N	33.5	16.7	7.22	1800	2330	3.3	308
2 Hi N	34.3	13.9	8.88	1799	2329	3.0	302
3 Hi M	34.1	12.8	9.59	1806	2338	2.5	313
3 Hi N	33.1	9.4	12.68	1802	2333	2.1	314
3.3.2 FUEL CONSUMPTION 3.3.2.1 In selected gear, at maximum power at rated speed							
1 Hi N	32.0	15.2	7.59	2197	2844	3.3	369
3.3.2.1.1 75 % of pull at maximum power at rated speed							
1 Hi N	25.4	11.4	8.01	2306	2985	2.7	419
3.3.2.1.2 50 % of pull at maximum power at rated speed							
1 Hi N	17.4	7.6	8.22	2340	3029	1.6	530
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 M	25.4	11.4	8.01	2127	2753	2.4	385
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 M	17.4	7.6	8.22	2164	2801	1.5	470
3.3.2.2 In selected gear nearest to 7.5 km/h at rated speed							
1 Hi N	32.0	15.2	7.59	2197	2844	3.3	369
3.3.2.2.1 75 % of pull at maximum power at rated speed							
1 Hi N	25.4	11.4	8.01	2306	2985	2.7	419
3.3.2.2.2 50 % of pull at maximum power at rated speed							
1 Hi N	17.4	7.6	8.22	2340	3029	1.6	530
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 Hi M	25.4	11.4	8.01	2127	2753	2.4	385
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 Hi M	17.4	7.6	8.22	2164	2801	1.5	470

Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
1.86	36	86	99	11	59	96.9
1.91	38	86	100	12	56	96.9
2.18	38	85	100	12	55	96.9
2.52	40	84	99	12	55	96.9
2.70	40	83	100	12	54	96.9
2.72	41	84	100	13	54	96.8
2.66	42	84	100	13	54	96.8
2.83	41	84	100	13	52	96.8
2.79	40	84	100	14	51	96.8
2.73	41	83	101	14	51	96.8
2.79	40	83	100	14	50	96.8
2.69	40	84	100	14	51	96.8
2.69	40	84	98	14	52	96.8
2.28	39	85	99	13	52	96.8
2.01	37	86	100	13	55	96.8
1.59	37	85	100	13	55	96.8
2.18	36	85	98	13	56	96.9
1.79	35	85	97	13	56	96.9
2.28	39	85	99	13	52	96.8
2.01	37	86	100	13	55	96.8
1.59	37	85	100	13	55	96.8
2.18	36	85	98	13	56	96.9
1.79	35	85	97	13	56	96.9

4. OPTIONAL TESTS RESULTS

4.1 BRAKING

Date of tests: 19th and 22nd March 2004

Tractor mass (with driver)

	Front	Rear	Total
	kg	kg	kg
Ballasted tractor	2000	3400	5400
Unballasted tractor	1535	2235	3770

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	37.6	0.105	1.06	51.46
		0.155	1.43	38.14
		0.205	2.39	22.82
		0.275	3.30	16.53
		0.305	3.89	14.02
		0.370	4.90	11.13
Unballasted tractor	37.9	0.100	0.92	60.24
		0.155	2.17	25.54
		0.210	3.79	14.62
		0.255	5.01	11.06

Maximum deviation of tractor from its original course: Not significant

Abnormal vibration: None

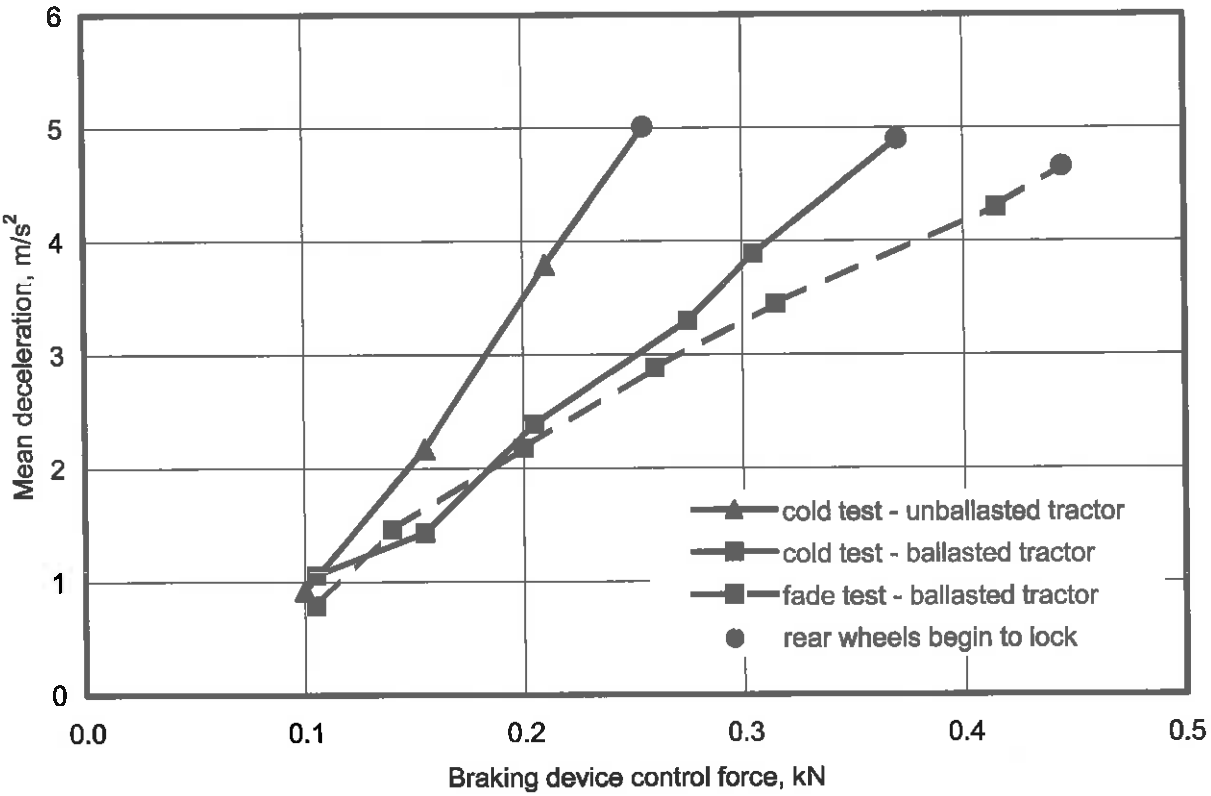
4.1.2 Fade test

	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	37.6	0.105	0.79	69.04
		0.140	1.46	37.36
		0.200	2.18	25.02
		0.260	2.88	18.94
		0.315	3.45	15.81
		0.415	4.30	12.68
		0.445	4.66	11.70

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	0.230	0.210

4.2 MEASUREMENT OF EXTERNAL NOISE

Date of tests: 9th December 2003

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 Hi N

Travelling speed before acceleration: 28.6 km/h

Sound level: 84.5 dB(A)

4.2.2 According to EEC directives 74/151/EEC (Annex VI) and 98/38/EC

Gear number:	5 Hi N
Travelling speed before acceleration:	28.6 km/h
Sound level:	83.5 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. Josef Šenk, CSc.