



STÁTNÍ ZKUŠEBNA ZEMĚDĚLSKÝCH,
POTRAVINÁŘSKÝCH
A LESNICKÝCH STROJŮ

163 04 PRAHA 6, ŘEPY

Report on test in accordance with the O. E. C. D. STANDARD CODES
for the Official Testing of Agricultural Tractors

CODE I

Full Code

Date of approval: 20 th January 1994

O.E.C.D. No. 1502



Agricultural Tractor
SLAVIA TV 824-S (4WD)

Manufactured by:
SLAVIA a.s.
763 61 Napajedla, CZ

Report No. 10959
Date of test: January-October 1993

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Tractor manufacturer's name and address: SLAVIA a.s., 763 61 Napajedla, Czech Republic

Location of tractor assembly: Napajedla, Czech Republic

Submitted for test by: The manufacturer

Selected for test by: The manufacturer

Place of running-in: Napajedla, Czech Republic

Duration of running-in: 64 hours

Location of test: SZZPLS Praha 6 - Řepy, Czech Republic

I. SPECIFICATIONS OF TRACTOR

TRACTOR

Make: SLAVIA

Model: TV 824-S

Type: Wheeled, unit construction, all wheels drive

Number of driving wheels: 4

Serial No.: 9203/0162

1st Serial No.: 9203/0162

ENGINE

Make: SLAVIA

Model: 2 S 90 A

Type: 4-stroke diesel engine, direct injection, air cooled, naturally aspirated

Serial No.: 265 662

Cylinders

Number/disposition: 2, in-line, vertical

Bore/stroke: 90 mm/90 mm

Capacity: 1145 cm³

Compression ratio: 17.2:1

Arrangement of valves: Overhead



Cylinder liners: Dry, replaceable

Supercharging None

Fuel system

Fuel feed system: Lift pump piston-type, integral with fuel injection pump

Make, model and type of fuel filters: SLAVIA, PC 4.8106.11, one - stage with paper cartridge

Capacity of fuel tank: 17 dm³

Make, model and type of injection pump: MOTORPAL, PR 2 M 7k 160 e 110, in-line

Serial No.: Kv 0456

Manufacturer's production setting of injection pump:

Flow rate (rated engine speed and full load): 5.63±0.48 dm³/h

Timing: 32°+1° before TDC

Make, model and type of injection: MOTORPAL, VP 81 S 953 e 2576 Uw, 2 holes

Injection pressure: 22.0-0.8 MPa

Governor

Make, model and type: MOTORPAL, centrifugal, variable speed

Governed range of engine speed: 700-3300 rev/min

Rated engine speed: 3000 rev/min

Air cleaner

Make, model and type: SANDRIK, 9410.03, oil bath

Location of air intake: Under bonnet forward of engine

Maintenance indicator: None

Lubrication system

Type of feed pump: Gear

Type of filter: Full flow with replaceable paper element

Number: 1

Cooling system

Type of coolant: Air cooling



Specification of fan: Axial, belt driven
Number of blades: 12
Fan diameter: 200 mm
Type of temperature control: None

Starting system

Make, model and type: PAL, R 5.10, electrical solenoid engaged
Starter motor power rating: 1.5 kW
Cold starting aid: Decompressor
Safety device: None

Electrical system

Voltage: 12 V, negative earth
Generator:
Make, model and type: PAL, 443 113 518 650, alternator, belt driven
Power: 190 W
Battery:
Number: 1
Rating: 63 Ah at 20 hours

Exhaust system

Make, model and type: SLAVIA, expansion muffler
Location: Left-hand side of engine, lateral discharged

TRANSMISSION TO WHEELS

Clutch

Make, model and type: TOMO VINKOVIČ, dry, single-plate for travelling and P.T.O.
Number of plates: 1
Diameter of plates: 190 mm
Method of operation: Mechanically by pedal

Gear box

Make, model and type: TOMO VINKOVIČ, mechanical
Arrangement: Gear box with 3 speeds, group gear box with two speed ranges and reverse (T, R and REV)



Number of gears: 6 forward and 3 reverse
Available options: None

Rear axle and final drives

Make, model and type: TOMO VINKOVIČ, crown wheel and bevel pinion differential and spur gear drives

Differential lock: None

Front axle and final drives

Make, model and type: TOMO VINKOVIČ, crown wheel and bevel pinion differential and spur gear final drives

Differential lock:

Type: Mechanical
Method of engagement: Mechanically by pedal
Method of disengagement: Self-disengaging

Total ratios and travelling speeds

Gear	Group	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed of 3000 rev/min km/h (*)
1	T	251.429	1.69
2		92.896	4.57
3		34.608	12.25
1	R	171.429	2.47
2		63.338	6.70
3		23.597	17.97
1	REV	171.429	2.47
2		63.338	6.70
3		23.597	17.97

T: Turtle range, R: Rabbit range

(*) Calculated with a tyre dynamic radius index of 375 mm (ISO 4251/1-1988).

Number of revolutions of front wheels for one revolution of rear-wheels: 1.0000



POWER TAKE-OFF

Main power take-off

Type: Not independent
 Method of engagement: Mechanically by pedal, driven by the main clutch
 Number of shafts: 1
 Method of changing power take-off speeds: By hand lever

Power take-off proportional to engine speed

Location: At rear of tractor

P.T.O.	Diameter of power take-off shaft end mm	Number of splines	In conformity with ISO 500/1991
540	34.9	6	Yes
1000	34.9	6	Yes

Height above ground: 460 mm
 Distance from the median plane of tractor: 0 mm
 Distance behind rear-wheel axis: 210 mm

P.T.O.	P.T.O. speed rev/min	Engine speed rev/min	Ratio of rotation speeds (engine/P.T.O.)	Power restriction kW
540	540	2440	4.5181	None
	664	3000		
1000	1000	3071	3.0706	None
	977	3000		

Direction of rotation (viewed facing driving end): Clockwise

Power take-off proportional to ground speed None

**POWER LIFT**

Make, model and type: TOMO VINKOVIČ, hydraulic without control

Type of hydraulic system: Open centre

Type and number of cylinders: 1 integral single-acting

Type of linkage lock for transport: Hydraulic

Relief valve pressure setting: 16.0+2.0 MPa

Opening pressure of cylinder safety valve: None

Lift pump type: Gear

Transmission between pump and engine: Gear driven from engine

Type and number of filters: None

Site of oil reservoir: Reservoir on the rear of engine

Type, number and location of tapping points: 2 pressure, quick release at rear of tractor, only for two single-acting hydraulic cylinders

Maximum volume of oil available to external cylinders: 7.2 dm³



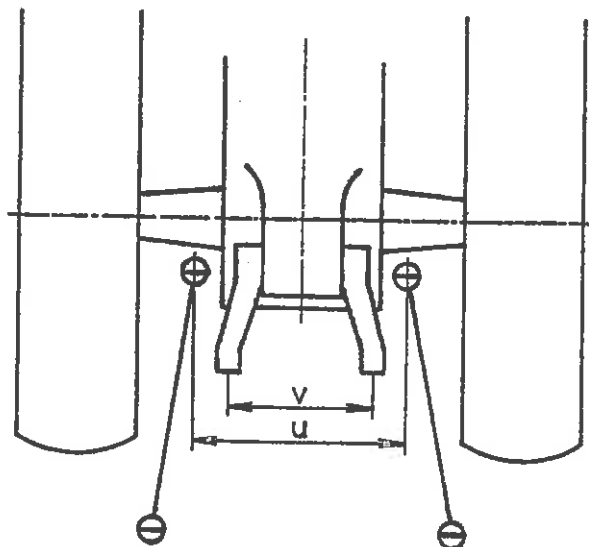
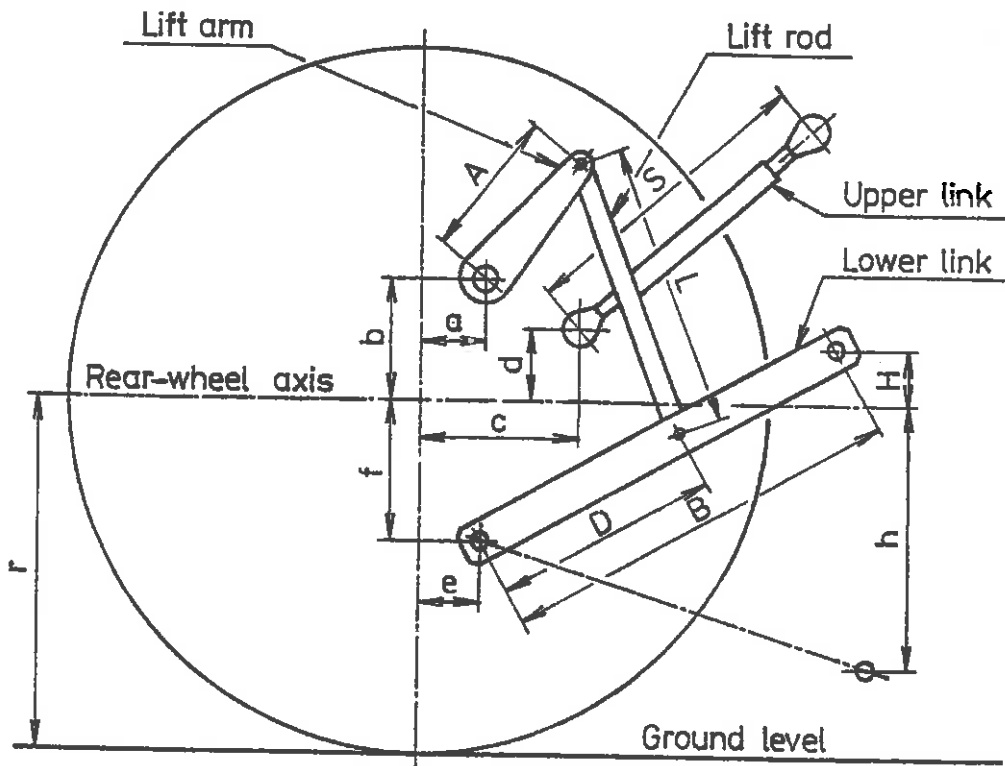
Three-point linkage

Category:

1N, in conformity with
ISO 730/2-1979

Category adapter:

None





Linkage geometry dimensions:

		Dimension or range mm	Settings used in test mm
Length of lift arms	(A)	270	270
Length of lower links	(B)	460	460
Distance of lift arm pivot point from :horizontally	(a)	65	65
rear-wheel axis :vertically	(b)	210	210
Horizontal distance between the 2 lower link points	(u)	300	300
Horizontal distance between the 2 lift arm end points	(v)	385	385
Length of upper link	(S)	340 to 450	410
Distance of upper link pivot point from :horizontally	(c)	155	155
rear-wheel axis :vertically	(d)	205, 265, 325	325
Distance of lower link pivot point from :horizontally	(e)	110	110
rear-wheel axis :vertically	(f)	50	50
Distance of lower link pivot points to lift rod pivot points on lower links	(D)	350	350
Length of lift rods	(L)	310 to 410	315
Height of lower hitch points relative to the rear-wheel axis:			
- in low position	(h)	160 to 330	175
- in high position	(H)	170 to 275	250
Height above ground of lower hitch points when locked in transport position (*)		Any height withing lift range	

(*) Assuming the tyre dynamic radius index $r=375$ mm of
ISO 4251/1-1988

SWINGING DRAWBAR

None

TRAILER HITCH

Type:

Clevis

Hole diameter:

26 mm



Height above ground: 340, 400, 460 and 620 mm
Distance of hitch point from rear-wheel axis, horizontally: 395 mm
Distance of hitch point from power take-off shaft end:
Vertically: -120, -60, 0 and 160 mm
Horizontally: 185 mm
Maximum vertical permissible load: 1.2 kN

HOLED DRAWBAR

Number of holes: 5
Distance between holes: 80 mm
Hole diameter: 22 mm
Thickness/width of the drawbar: 20 mm/60 mm
Height above ground:
Maximum: 625 mm
Minimum: 200 mm
Horizontal distance to power take-off shaft end: 355 mm

FRONT TOWING HITCH

Height above ground: 325 mm
Diameter of pin hole: 30 mm

STEERING

Make, model and type: TOMO VINKOVIČ, mechanical, working on centre pivot of the tractor
Method of operation: Mechanically

BRAKES

Service brake

Make, model and type: TOMO VINKOVIČ, dry drum
Method of operation: Mechanically by one pedal
Trailer braking take-off: Hydraulic brake operated by tractor pedal

Parking brake

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

WHEELS

Number:
Front: 2, steering and driving
Rear: 2, driving
Wheelbase: 1180 mm
Track width adjustment:

	Minimum mm	Maximum mm	Adjustment method
Front	980	980	None
Rear	1000	1000	None

PROTECTIVE STRUCTURE

Make, model and type: TOMO VINKOVIČ, TV 731, four-post frame
Manufacturer's name and address: TOMO VINKOVIČ, Bjelovar, Croatia
Protective device: Frame, not tiltable
O.E.C.D. approval number: None

DRIVER'S SEAT

Make, model and type: AGRIS-PTUJ, upholstered seat
Type of suspension: Parallelogram linkage adjustable for driver's weight
Type of damping: Hydraulic
Range of adjustment: None

MISCELLANEOUS

Additional seat: None

**LIGHTING**

	Height above ground of centre mm	Size mm	Distance from outside edge of lights to median plane of tractor mm
Headlights	810	φ135	205
Sidelights	760	115x70	505
Rearlights	820	55x55	505
Reflectors	775	85x30	495

II. TEST CONDITIONSOverall dimensions

	Length mm	Width		Height at top of protective structure mm
		minimum mm	maximum mm	
Ballasted	2810	1225	1235	1990
Unballasted	2810	1225	1235	1990

Ground clearance

(unballasted tractor): 245 mm

Clearance-limiting part: Differential of rear axle

Tractor mass (with cab)

	Ballasted		Unballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	655	675	655	675
Rear	435	490	385	440
Total	1090	1165	1040	1115



Ballast

	Weights		Water kg
	Number	Total mass kg	
Front	-	-	-
Rear	2	50	-
Optional	-	-	-

Tyre and track width specifications

	Front	Rear
Tyres:		
Make	BARUM	BARUM
Dimensions	7.50-16	7.50-16
Ply rating	6	6
Type	diagonal	diagonal
Maximum load (tyre manufacturer's)	8.56 kN	8.56 kN
Maximum load (tractor manufacturer's)	3.38 kN	3.25 kN
Inflation pressure (tyre manufac.)	280 kPa	280 kPa
Dynamic radius index	375 mm	375 mm
Chosen track width:	980 mm	1000 mm

Oils and lubrication

Capacity and change interval:

	Capacity dm ³	Oil change h	Filter change h
Engine	4.5	250	100
Gear box	10.0	500	-
Front axle		Common with gear box	
Rear axle	10.0	500	-
Final drive (front)		Common with gear box	
Final drive (rear)		Common with rear axle	
Hydraulic system	7.2	500	-
Steering	2.0	500	-
Air cleaner	0.5	50	-



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
Hydraulic fluid: Type Viscosity Classification	OH-HM 32 28.8 cSt at 40 °C ISO 6743 HM 32	As recommended

Steering oil: Same as transmission

Air cleaner filling: Same as engine

Grease:

Number of lubrication
points: 8

Fuel

Type: Diesel fuel, in conformity with
national standard ČSN 65 6506

Density at 15 °C: 0.835 g/cm³ for P.T.O. tests
0.843 g/cm³ for drawbar tests



III. TEST RESULTS

COMPULSORY TESTS RESULTS

1. MAIN POWER TAKE-OFF

Date and location of tests: 15th March 1993, SZZPLS Praha

Type of dynamometer: FROUDE AG 400

Power	Speed		Fuel consumption			Specific energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kWh/l
1.1 MAXIMUM POWER - TWO-HOUR TEST						
13.7	3000	664	4.70	5.63	343	2.43
1.2 POWER AT RATED ENGINE SPEED						
13.7	3000	664	4.70	5.63	343	2.43
1.3 STANDARD POWER TAKE-OFF SPEED 540 rev/min						
12.2	2440	540	3.73	4.47	306	2.73
1.4 PART LOADS						
1.4.1 the torque corresponding to maximum power at rated engine speed						
13.7	3000	664	4.70	5.63	343	2.43
1.4.2 85 % of torque obtained in 1.4.1						
11.9	3063	678	4.42	5.29	371	2.25
1.4.3 75 % of torque defined in 1.4.2						
9.2	3167	701	3.72	4.46	404	2.06
1.4.4 50 % of torque defined in 1.4.2						
6.2	3190	706	3.20	3.83	516	1.62
1.4.5 25 % of torque defined in 1.4.2						
3.1	3203	709	2.55	3.05	823	1.02
1.4.6 unloaded						
-	3217	712	2.01	2.41	-	-



Power	Speed		Fuel consumption			Specific energy
	Engine	P.T.O.	Hourly		Specific	
kW	rev/min		kg/h	l/h	g/kWh	kWh/l
1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED 540 rev/min						
1.5.1 the torque corresponding to maximum power						
12.2	2440	540	3.73	4.47	306	2.73
1.5.2 85 % of torque obtained in 1.5.1						
10.6	2494	552	3.14	3.76	296	2.82
1.5.3 75 % of torque defined in 1.5.2						
8.0	2512	556	2.62	3.14	328	2.55
1.5.4 50 % of torque defined in 1.5.2						
5.4	2535	561	2.09	2.50	387	2.16
1.5.5 25 % of torque defined in 1.5.2						
2.7	2553	565	1.60	1.92	593	1.41
1.5.6 unloaded						
-	2562	567	1.17	1.40	-	-

No load maximum engine speed: 3217 rev/min

Torque (equivalent crankshaft) at maximum power: 43.6 Nm

Maximum torque (equivalent crankshaft): 47.7 Nm
(engine speed: 2001 rev/min)

Mean atmospheric conditions:

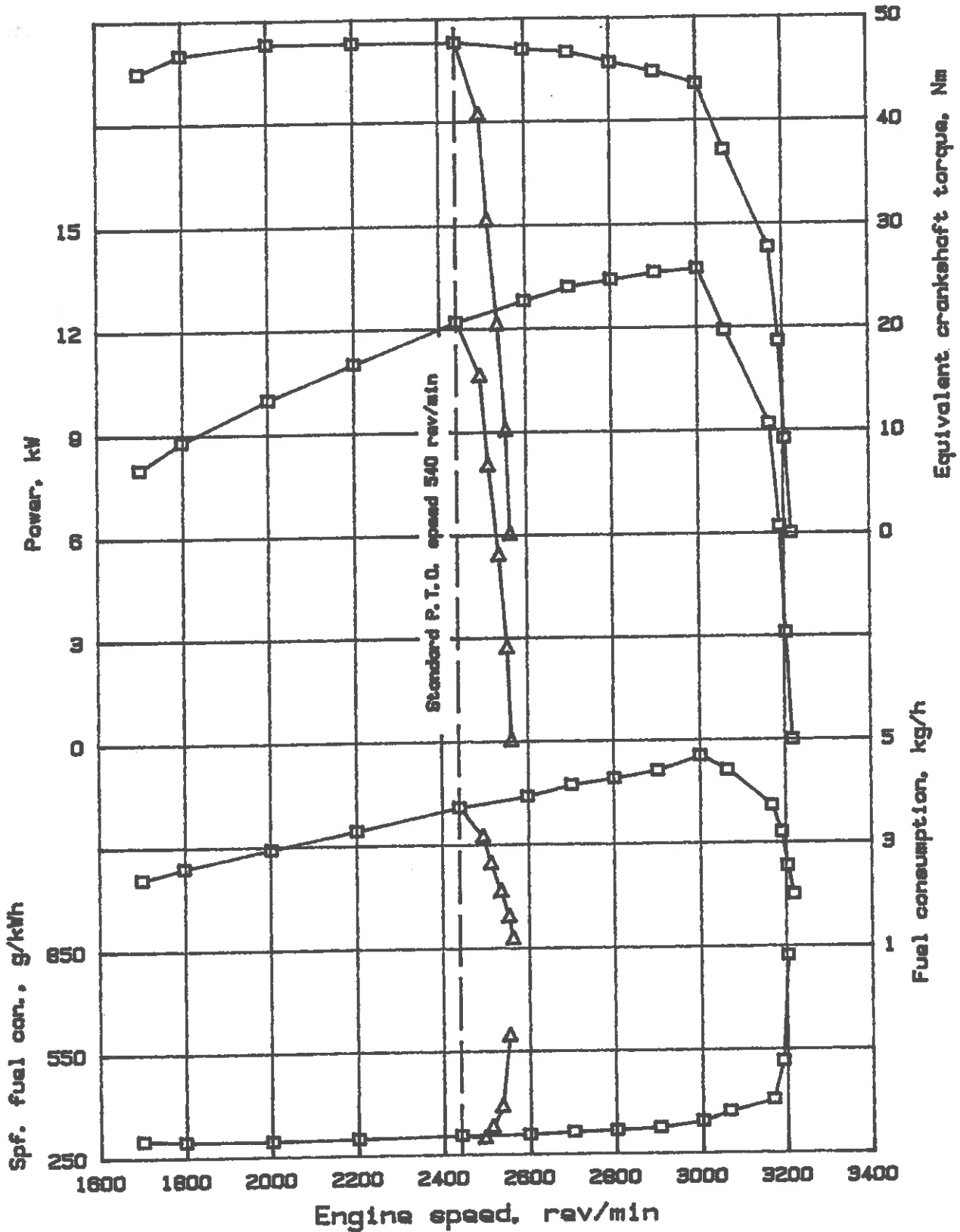
Temperature: 20 °C
 Pressure: 97.9 kPa
 Relative humidity: 19 %

Maximum temperatures:

Coolant: 91 °C
 Engine oil: 129 °C
 Fuel: 48 °C
 Engine air intake: 25 °C

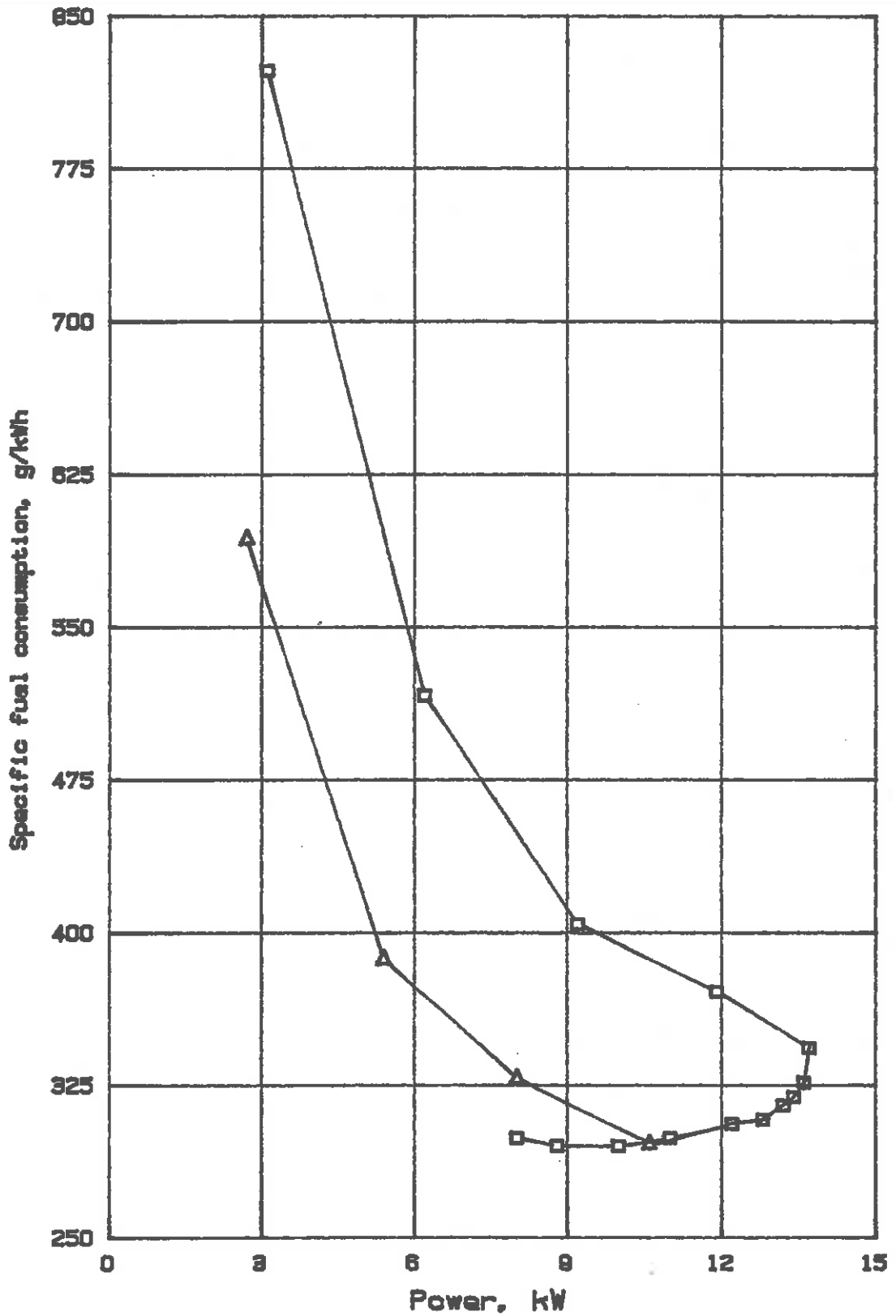


POWER TAKE-OFF TEST





POWER TAKE-OFF TEST





2. HYDRAULIC POWER AND LIFTING FORCE

Date of test: 13th July 1993

2.1 HYDRAULIC POWER TEST

Sustained pressure with relief valve open: 17.6 MPa

Pump delivery rate at minimum pressure: No measurement, quick release only for two single-acting hydraulic cylinders (see page 8)

Tapping point used for test: External tapping

Temperature of hydraulic fluid: 67 °C

Opening and closing pressures of the unloading valve: Not applicable

2.2 POWER LIFT TEST

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	200 mm	160 mm
Vertical movement	425 mm	555 mm
Maximum corrected force exerted through full range	9.7 kN	6.0 kN
Corresponding pressure of hydraulic fluid	15.8 MPa	15.8 MPa
Moment about rear-wheel axis	5.5 kNm	7.1 kNm
Maximum tilt angle of mast from vertical	-	12 degrees



Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-165	-125	-100	0	+100	+150	+200	+250	+300	+350	+390
Lifting forces at the hitch points, corrected to 15.8 MPa											
kN	-	9.8	9.7	10.2	10.8	11.1	11.4	11.5	10.9	-	-
Lifting forces at the test frame, corrected to 15.8 MPa											
kN	8.0	-	8.1	8.3	8.3	8.2	8.1	7.9	7.3	6.7	6.0

3. DRAWBAR PERFORMANCE

Date of test:

20th and 21st October 1993

Type of track:

Bituminous-concrete surface

	Height of drawbar above ground	Tyre inflation pressure	
		Front	Rear
Unballasted	340 mm	100 kPa	100 kPa
Ballasted	340 mm	100 kPa	100 kPa



Gear and group	Power	Drawbar pull	Speed	Engine speed	Slip of wheels	Specific fuel consumption
	kW	kN	km/h	rev/min	%	g/kWh

3.1 MAXIMUM POWER IN TESTED GEARS (unballasted tractor)

1 T	3.5	8.2	1.53	3197	15.0	817
1 R	5.1	8.2	2.23	3186	15.0	644
2 T	9.1	8.3	3.96	3064	15.0	485
2 R	11.1	6.5	6.12	3002	8.6	423
3 T	10.8	3.3	11.77	3000	4.0	435
3 R	10.2	2.1	17.52	3005	2.5	461

3.2 MAXIMUM POWER IN TESTED GEARS (ballasted tractor)

1 T	3.7	8.7	1.53	3196	15.0	788
1 R	5.3	8.6	2.23	3183	15.0	632
2 T	9.4	8.6	3.94	3043	15.0	480
2 R	11.0	6.5	6.08	3000	9.1	427
3 T	10.7	3.3	11.72	2997	4.4	439
3 R	10.2	2.1	17.47	3000	2.8	461

3.3.1 FIVE-HOUR TEST at 75 % of pull at maximum power

2 R	8.8	4.9	6.46	3101	6.6	473
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3.3.2 FIVE-HOUR TEST at pull corresponding to 15 % wheelslip

2 T	9.4	8.6	3.94	3043	-	-
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Specific energy	Temperature			Atmospheric conditions		
	Fuel	Coolant	Engine oil	Temperature	Relative humidity	Pressure
kWh/l	°C	°C	°C	°C	%	kPa
1.03	42	-	82	6	98	96.8
1.31	43	-	89	6	98	96.8
1.74	43	-	89	6	98	96.7
1.99	45	-	94	9	78	96.6
1.94	45	-	97	6	98	96.6
1.83	47	-	89	10	78	96.6
1.07	44	-	86	9	87	96.6
1.33	44	-	86	9	82	96.6
1.76	44	-	90	9	87	96.7
1.97	45	-	93	8	85	96.7
1.92	47	-	98	9	78	96.7
1.83	47	-	98	8	85	96.6
1.78	46	-	97	4	83	97.1
-	47	-	101	5	72	97.3

Oil consumption during ten hours duration of tests 3.3.1 and 3.3.2:

9.6 g/h



4. TURNING AREA AND TURNING CIRCLE

	Right-hand m	Left-hand m
Radius of turning area	2.97	2.78
Radius of turning circle	2.85	2.66

5. LOCATION OF CENTRE OF GRAVITY

Height above ground: 378 mm
 Distance forward from the vertical plane containing the axis of the rear-wheels: 714 mm
 Distance from the median plane of the tractor: 2 mm to left

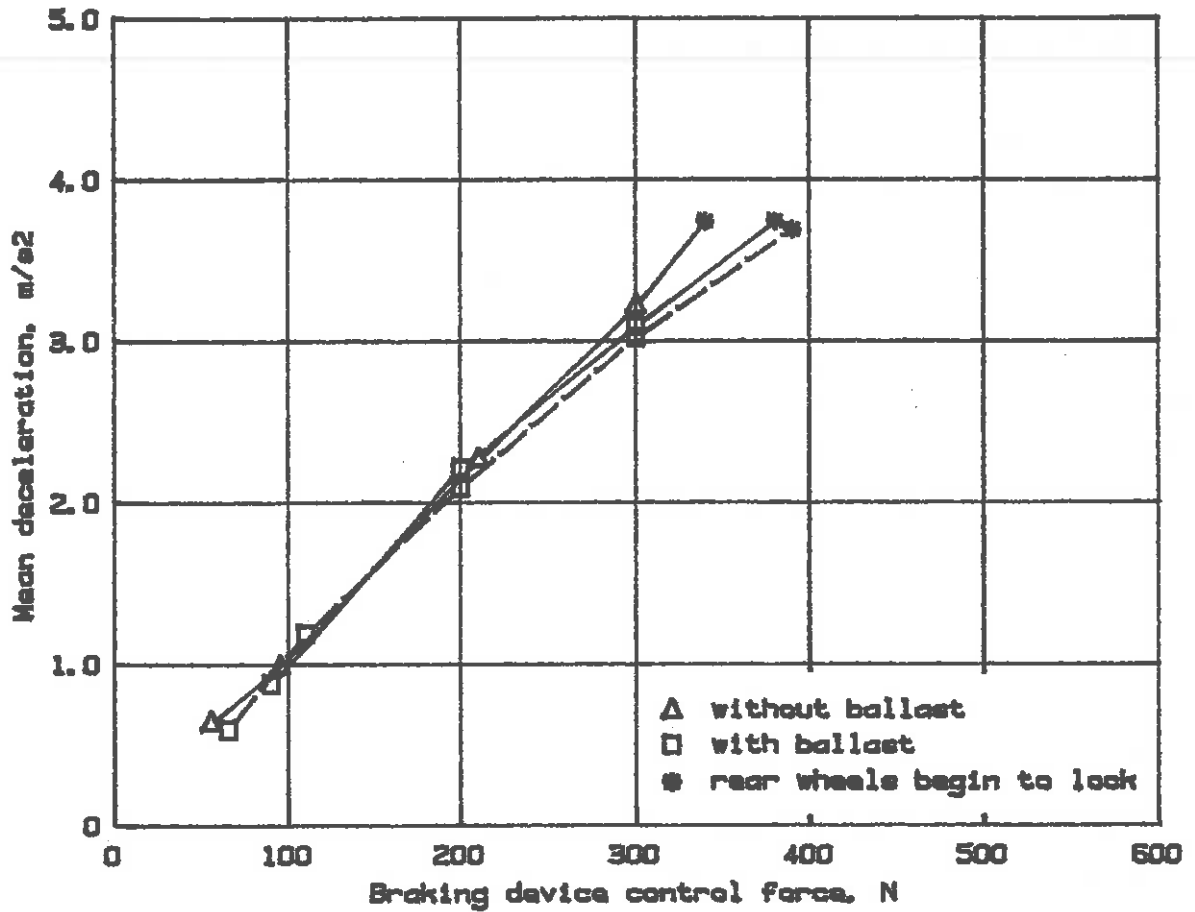
6. BRAKING

Date of test: 3rd and 4th June 1993

	Tractor mass (with driver)			Speed before application of brakes km/h
	Front kg	Rear kg	Total kg	
Ballasted	675	650	1325	18.9
Unballasted	675	440	1115	19.1

6.1 COLD SERVICE BRAKING DEVICE TEST (—————)

6.2 FADE TEST (- - - - -)



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

6.3 PARKING BRAKING DEVICE TEST

Ballasted tractor on 18 % - slope		
	Uphill	Downhill
Braking device control force	140 N	120 N

**7. MEASUREMENT OF EXTERNAL NOISE LEVEL**

Date of test: 28th June 1993
Make and model of sound level meter: BRÜEL & KJAER, 2231
Type of track: Bituminous-concrete surface
Gear number: 3 R
Travelling speed before acceleration: 14.3 km/h
Sound level: 81.5 dB(A)

8. REPAIRS None

9. REMARKS None

Test carried out by: Dipl. Ing. Petr Doležal

Head of the Tractor Department
Dipl. Ing. Peter Pernis

Director
Dipl. Ing. Vladimír Hanzlík

