OECD Approval No. 904

Test in accordance with the OECD standard code for the official testing of agricultural tractors

Report on test of Zetor 8111 Tractor with Two-Wheel Drive



Manufactured by	Zavody Tazkeho Strojarstva, Narodny Podnik, Box 03657 Martin, Czechoslovakia.
Test No.	R84/70333/OECD
Report No.	695
Date	August 1984

THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

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TABLE OF CONTENTS

	Page No.
SPECIFICATION OF TRACTOR	1
CONDITIONS DURING TEST	11
FUEL AND LUBRICANTS USED IN TESTS	12
COMPULSORY TESTS	
1 Main power take-off performance	13
2 Drawbar performance	17
3 Turning space and turning circle	19
4 Location of centre of gravity	19
5 Braking	19
6 Measurement of external noise level	20
7 Noise measurement at the driver's ear	21
8 Power lift and hydraulic pump performance	21
REPAIRS AND ADJUSTMENTS DURING TESTS	23
REMARKS	23

Tractor manufacturer's name and address:	Zavody Tazkeho Strojarstva, Narodny Podnik, Box 03657 Martin, Czechoslovakia.
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running in:	Z.T.S. Martin, Czechoslovakia
Duration of running in:	80 hours

SPECIFICATION OF TRACTOR

TRACTOR

Make:	Z.T.S. N.P. Martin
Trade name:	Zetor
Model:	Z 8111
Type:	2-wheel drive, unit construction
Serial No:	100 003
1st Serial No:	100 001

ENGINE

Make:	Z.T.S. N.P. Martin
Model:	Z 8002.1
Type:	4 stroke, direct injection diesel
Serial No:	000 005

Cylinders

Number/disposition:	4, vertical, in-line
Bore/stroke:	110 mm x 120 mm (4.3 in x 4.7 in)
Capacity:	4562 cm^3 (278 in^3)
Compression ratio:	17:1 nominal
Arrangement of valves:	Overhead
Cylinder liners:	Replaceable, wet

Fuel System

Fuel feed system:	Lift pump integral with fuel injection pump
Make, type and model of fuel filter(s):	Autobrzdy, dual, 03-9800.00
Capacity of fuel tank:	125 l (27.5 UK gal)
Make, type and model of injection pump:	Motorpal, in-line, PP4 M85 KLE 3117
Serial No:	N2 1152
Manufacturer's production setting of injection pump, flow rate and timing:	16.4-17.3 l/h (28.9-30.4 pt/h) at 2200 rev/min engine speed, $24^{\circ} + 2^{\circ}$ before T.D.C.
Make, type and model of injectors:	Motorpal, DOP 150S4284367, 4-hole
Injection pressure:	16.0-17.6 MPa (158-174 atm)

Governor

Make:	Motorpal
Type:	Mechanical
Model:	RV 3M 300/1100
Governed range of engine speed:	600-2450 rev/min

Rated engine speed: 2200 rev/min

Air cleaner

Pre-cleaner	
Make:	Sandrik
Type:	Stack cap with mesh screen
Model:	PC 350
Location:	Under bonnet forward of radiator
Main	
Make:	Sandrik
Type:	Oilbath
Model:	9430.11
Oil capacity:	1.8l (3.2 pt)
Location:	Under bonnet forward of radiator
Maintenance indicator:	None

Lubrication system

Type of feed pump:	Gear
Total oil capacity including filter:	10.0 l (17.6 pt)
Oil change period:	200 hours
Type of filter:	Centrifugal, replaceable element
Number:	1
Filter change period:	200 hours
Recommended oil:	S.A.E. 10w/30

Cooling system	
Type of coolant:	Water and anti-freeze 1:1
Specification of pump	
Type:	Centrifugal, belt driven
Description of fan:	Belt driven
Number of fan blades:	4
Fan diameter:	460 mm (18.1 in)
Coolant capacity:	20.0 l (35.2 pt)
Type of temperature control:	Thermostat
Superpressure system:	0.41 bar (5.9 lb/in^2)
Starting system	
Safety device:	Gear selector lever to be in neutral position
Make:	Pal-Magneton
Type:	Electrical, solenoid engaged
Model and starter motor power rating:	12V, 2.9 kW (3.9 hp)
Cold starting aid:	None
Electrical system	
Voltage:	12
Generator:	Alternator
Make:	Pal-Magneton
Model:	443 113 516 184
Type:	14v, 55A
Power:	55 A at 9000 rev/min
Batteries	2, Prazska, Akumulatorka
Rating:	2 x 100 Ah at 20 hour rating
Exhaust system	
Make:	Z.T.S.
Type:	Oval, baffle
Location:	Left-hand side of engine, vertical
Height of outlet above ground:	2.64 m (104.0 in)

TRANSMISSION

Clutch

Make:	Z.T.S.
Type:	Dry, for transmission only.
Number of plates:	1
Diameter of plate:	350 mm (13.8 in)
Method of operation:	Mechanically by pedal

Gear box

Make:	Povazske Strojarne
Type:	Mechanical
Arrangement:	4 forward x 2 ranges x torque multiplier 4 reverse x torque multiplier
Number of speeds:	16 forward and 8 reverse
Available options:	1 creep gear, less torque multiplier

Rear axle and final drives

Make:	ZPC Ursus
Type:	Crown wheel and pinion, bevel gear and differential, planetary reduction gear final drives
Differential lock	
Type:	Mechanical
Method of engagement:	Manual by pedal
Method of disengagement:	Self disengaging

Front axle

Make	2PC Ursus

Transmission oils

Capacity

Gear box and transmission housing:	53.5 l (94.2 pt) including oil for hydraulics
Change period:	1200 hours
Filter change period:	600 hours
Final drive(s):	2 x 4.0 l (14.1 pt)
Change period:	1200 hours

Gear No	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed: 2200 rev/min km/h	(mile/h)
Forward			
L1 M	348.40	1.89	(1.17)
L1	260.40	2.53	(1.57)
L2 M	221.03	2.98	(1.85)
L2	165.20	3.99	(2.48)
L3 M	139.10	4.74	(2.95)
H1 M	119.41	5.52	(3.43)
L3	103.98	6.34	(3.94)
L4 M	97.71	6.75	(4.19)
H1	89.26	7.39	(4.59)
H2 M	76.04	8.70	(5.41)
L4	73.03	9.03	(5.61)
H2	56.63	11.64	(7.23)
H3 M	47.68	13.86	(8.61)
H3	35.64	18.50	(11.50)
H4 M	33.50	19.68	(12.23)
H4	25.04	26.34	(16.37)
Reverse			
1 M	257.75	2.59	(1.61)
1	190.42	3.46	(2.15)
2 M	161.63	4.08	(2.54)
2	120.82	5.46	(3.39)
3 M	101.72	6.48	(4.03)
3	76.04	8.67	(5.39)
4 M	71.45	9.23	(5.74)
4	53.40	12.35	(7.67)

M = Torque Multiplier engaged

Rear tyre size: 16.9-38

Tyre loaded radius: 795 mm (31.3 in)

POWER TAKE-OFF

Main power take-off

Type: Hydraulically operated, independent of main clutch

Method of engagement: By hand lever

Number of shafts: 1

Method of changing power take-off speeds: Manually, by exchanging shafts

Power take-off proportional to engine speed

(i) 540 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft:	34.9 mm (1.375 in)
Number of splines:	6 to I.S.O. standard
Height above ground:	640 mm (25.2 in)
Distance from the median plane of the tractor:	Central
Distance behind rear axle:	510 mm (20.1 in)
Pto speed at rated engine speed:	628 rev/min
Engine speed at standard power take-off speed:	1890 rev/min
Engine to pto ratio:	3.50:1
Power restriction:	45.0 kW (60.3 hp)
Direction of rotation (viewed facing driving end):	Clockwise

(ii) 1000 rev/min

Location:	At rear of tractor
Diameter of power take-off shaft:	34.9 mm (1.375in)
Number of splines:	21 to I.S.O. standard
Height above ground:	640 mm (25.2 in)
Distance from the median plane of the tractor:	Central
Distance behind rear axle:	510 mm (20.1 in)
Pto speed at rated engine speed:	1146 rev/min
Engine speed at standard power take-off speed:	1920 rev/min
Engine to pto ratio:	1.92:1
Direction of rotation (viewed facing driving end):	Clockwise

Power take-off proportional to ground speed

Speed of shaft:	1000 rev/min
Size of tyre:	16.9-38
Travelling distance for one revolution of power take-off shaft:	182 mm (7.2 in)
Number of pto shaft revolutions for one revolution of rear wheels:	27.4
Direction of rotation with forward gear engaged:	Clockwise

HYDRAULIC LIFT

Make:	PZL Hydral Wroclaw
Type:	88 400 000
Type and number of cylinders:	One internal single acting, one external double acting
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	18.5-19.5 MPa (2680-2830lb/in^2)
Opening pressure of cylinder safety valve:	18.5 - 19.5 MPa (2680-2830lb/in^2)
Lift pump type:	Gear, PZ 2-18KS
Transmission between pump and engine:	Geardriven
Make and number of filters:	ZPC, 2
Time between oil changes:	1200 hours
Time between filter changes:	600 hours
Oil capacity:	53.5 l (94.2 pt)
Type and number of tapping points:	6, quick release at rear of tractor
Maximum volume of oil available to external cylinders:	15.0 l (26.4 pt)

1 ba = 10^5 Pa

THREE-POINT LINKAGE

Category:	2 to I.S.O. standard
Controls:	Draught or position control, lower link sensing, adjustable speed on drop

DRAWBAR

Swinging

Height above ground,	maximum:	390 mm (15.4 in)
	minimum:	307 mm (12.1 in)
Type of adjustment:		Inverting drawbar
Distance of hitch point from rear axle centre:		905 and 855 mm (35.6 and 33.7 in) to rear
Distance of hitch point from power take-off shaft end:		
vertically:	maximum:	335 mm (13.2 in)
	minimum:	252 mm (9.9 in)
horizontally:		370 and 320 mm (14.6 and 12.6 in) to rear
Lateral adjustment:		310 and 330 mm (12.2 and 13.0 in)
Distance of pivot point from rear axles horizontally:		330 mm (13.0 in) to rear
Diameter of drawbar pin holes:		32 mm (1.3 in)

Linkage

Height above ground,	maximum:	1045 mm (41.1 in)
	minimum:	145 mm (5.7 in)
Horizontal distance to power take-off shaft end:		587 mm (23.1 in), to rear
Number of holes:		7
Distance between holes:		82 mm (3.2 in)
Hole diameter:		32 mm (1.3 in)
Thickness and width of drawbar:		70 mm x 90 mm (2.8 x 3.5 in)

Trailer hitch

Height above ground,	maximum:	817 mm (32.2in)
	minimum:	667 mm (26.3in)
Distance of hitch point from rear axle centre:		890 mm (35.0 in) to rear
Distance of hitch point from power take-off shaft end		
vertically above,	maximum:	180 mm (7.1in)
	minimum:	30 mm (1.2 in)
horizontally:		355 mm (14.0 in) to rear
Maximum vertical permissible load:		22.0 kN (4950 lb)

Front towing hitch

Vertical height at centre of clevis:	805 mm (31.7 in)
Width of clevis:	70 mm (2.8 in)
Diameter of pin hole:	32 mm (1.3 in)

STEERING

Make:	Pilmet
Model:	89276
Type:	Power assisted, hydraulic pump in transmission, single assister ram
Working pressure:	86.3 bar (1250 lb/in^2)
Oil capacity:	8.0 l (14.1 pt)
Oil change period:	1200 hours
Filter change period:	1200 hours
Recommended oil:	SAE OL-N2

BRAKES

Service brake

Make:	Zetor
Model:	89 227 000
Type:	Dry disc, multiplate
Method of operation:	Hydraulic by pedals coupled or independent
Trailer brakes	Air brake operated by tractor pedals

Parking brake

Type:	Mechanical
Method of operation:	Hand lever with ratchet operating mechanical linkage on service brakes

STEERING WHEELS

Number:	2
Location:	At front of tractor
Tyres:	Barum
Size:	7.5-20
Ply rating:	6
Type of casing:	Cross ply
Maximum permissible load on each tyre:	850 kg (1874 lb)
Corresponding inflation pressure:	250 kPa (36 lb/in^2)
Track widths:	1350-1800 mm (53-71 in)
Method of adjustment:	By changing wheel discs to either side of wheel centre

DRIVING WHEELS

Number:	2
Location:	At rear of tractor
Rear Tyres:	Barum
Size:	16.9-38
Ply rating:	8
Type of casing:	Cross ply
Maximum permissible load on each tyre:	2520 kg (5556 lb)
Corresponding inflation pressure:	170 kPa (24 lb/in^2)
Track widths:	1500-1875 mm (59-74 in)
Method of adjustment:	Reversing wheels and off-set lug rims

WHEELBASE

2390 mm (94.1 in)

PROTECTIVE STRUCTURE SPECIFICATIONS

OECD approval number:	None
Trade name:	Zetor BK 12011
Manufacturer's name and address:	Vlad, Presov

Description:

The safety cab has an integral six-post protective structure attached to the tractor through four anti-vibration mounts, the unit does not tilt. Mounting steps and a door are fitted at each side.

The structure has a steel roof, safety glass windows and noise reduction cladding.

DRIVER'S SEAT

Make:	Mars
Type of suspension:	Parallelogram linkage
Type of damping:	Hydraulic
Range of adjustment, longitudinal:	150 mm (5.9 in)
vertical:	90 mm (3.5 in)

MISCELLANEOUS

Passenger's seat:	Mars
Location:	Behind driver
Number of places:	One

LIGHTING

Unrestricted beam angle of head light in plan view 22^{o}

	Height above ground of centre, mm (in)	Size, mm (in)	Distance from outside edge of tractor to centre, at 1500 mm (59.1 in) track width, mm (in)
Headlights	1100 (43.7)	124 (4.9) dia	785 (30.9)
Sidelights	1750 (68.9)	55 x 50 (2.2 x 2.0)	65 (2.6)
Rear lights	1425 (56.1)	105 x 75 (4.1 x 3.0)	260 (10.2)
Reflectors	870 (34.3)	80 (3.1) dia	35 (1.4)

TEST CONDITIONS

Overall dimensions

(front: 7.5-20, rear: 16.9-38 tyres fitted)

	Length, m (in)	Width, min. m (in)	Width, max. m (in)	Height at top of, exhaust silencer, m (in)	Height at top of, protective structure, m (in)
With ballast	4.140 (163.0)	1.940 (76.4)	2.280 (89.8)	2.635 (103.7)	2.655 (104.5)
Without ballast	4.140 (163.0)	1.940 (76.4)	2.280 (89.8)	2.640 (104.0)	2.660 (104.7)

Ground clearance

Clearance : 300 mm (11.8 in) limited by drawbar bracket

Track setting

Front: 1530 mm (60.2 in)

Rear: 1500 mm (59.1 in)

Tractor mass and ballasting

Tractor mass

(without driver but with tanks full - with cab)

		Front	Rear	Total
Without ballast,	kg (lb)	1362 (3003)	2778 (6124)	4140 (9127)
With ballast,	kg (lb)	1362 (3003)	3819 (8419)	5181 (11422)

Ballast

	Weights		Water kg (lb)
	Number	kg (lb)	
Front	Nil	Nil	Nil
Rear	8	339 (747)	702 (1548)
Additional	Nil	Nil	

Fuel and lubricants used in tests

Fuel

Diesel oil to Class D British Standard 2869: 1970
Specific gravity at 15°C (60° F): 0.8515

Oils	Recommended	Used during test
Engine oil		
Type:	S.A.E. 10w/30	S.A.E. 10w/30
Viscosity:	71.5 cSt at 50°C (122°F)	71.5 cSt at 50°C (122°F)
M.I.L.	L-45199B	L-45199B
	or L-2104C	or L-2104C
Transmission oils		
Type:	S.A.E 80	PP 80
Viscosity:	44.2 cSt at 50°C (122°F)	44.2 cSt at 50°C (122°F)
API	GL-4	GL-4
Final drives		
Type:	S.A.E. 90	S.A.E. 90
Viscosity	125 cSt at 50°C (122°F)	125 cSt at 50°C (122°F)
API:	GL-3	GL-3
Hydraulic fluid		
Type:	S.A.E 80	PP 80
Viscosity:	44.2 cSt at 50°C (122°F)	44.2 cSt at 50°C (122°F)
API:	GL-4	GL-4
Steering oil		
Type:	OL-N2	OL-N2
Viscosity:	15.2 cSt at 50°C (122°F)	15.2 cSt at 50°C (122°F)
ISO:	WG-22	WG-22
Recommended grease:	Mobilgrease MP	Mobilgrease MP
Number of lubrication points:	14	

TEST RESULTS

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 16th February 1984, NIAE, Silsoe, Bedford, UK

Type of dynamometer: Water brake, Heenan and Froude

Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly, l/h (UKgal/h)	Hourly, kg/h (lb/h)	Specific, kg/kWh (lb/hph)	Specific energy, kWh/l (hph/UKgal)
	Engine	P.t.o.				
MAXIMUM POWER - 2 HOUR TEST						
52.8 (70.8)	2200	1146	16.50 (3.63)	14.05 (30.97)	0.266 (0.437)	3.20 (19.5)
POWER AT RATED ENGINE SPEED						
52.8 (70.8)	2200	1146	16.50 (3.63)	14.05 (30.97)	0.266 (0.437)	3.20 (19.5)
POWER AT STANDARD POWER TAKE-OFF SPEED						
49.3 (66.1)	1920	1000	14.92 (3.28)	12.70 (28.01)	0.258 (0.424)	3.31 (20.1)
PART LOADS						
(1) 85% of the torque obtained at maximum power at rated engine speed						
46.1 (61.9)	2265	1180	14.51 (3.19)	12.36 (27.25)	0.268 (0.440)	3.18 (19.4)
(2) Unloaded						
0	2440	1271	5.34 (1.18)	4.55 (10.03)	-	-
(3) 50% of the torque defined in (1)						
24.0 (32.2)	2356	1227	9.53 (2.10)	8.12 (17.89)	0.338 (0.556)	2.52 (15.3)
(4) The torque corresponding to maximum power at rated engine speed						
52.8 (70.8)	2200	1146	16.50 (3.63)	14.05 (30.97)	0.266 (0.437)	3.20 (19.5)
(5) 25% of the torque defined in (1)						
12.3 (16.4)	2408	1254	7.35 (1.62)	6.26 (13.81)	0.511 (0.839)	1.67 (10.2)
(6) 75% of the torque defined in (1)						
35.4 (47.5)	2318	1207	11.86 (2.61)	10.09 (22.25)	0.285 (0.469)	2.99 (18.2)

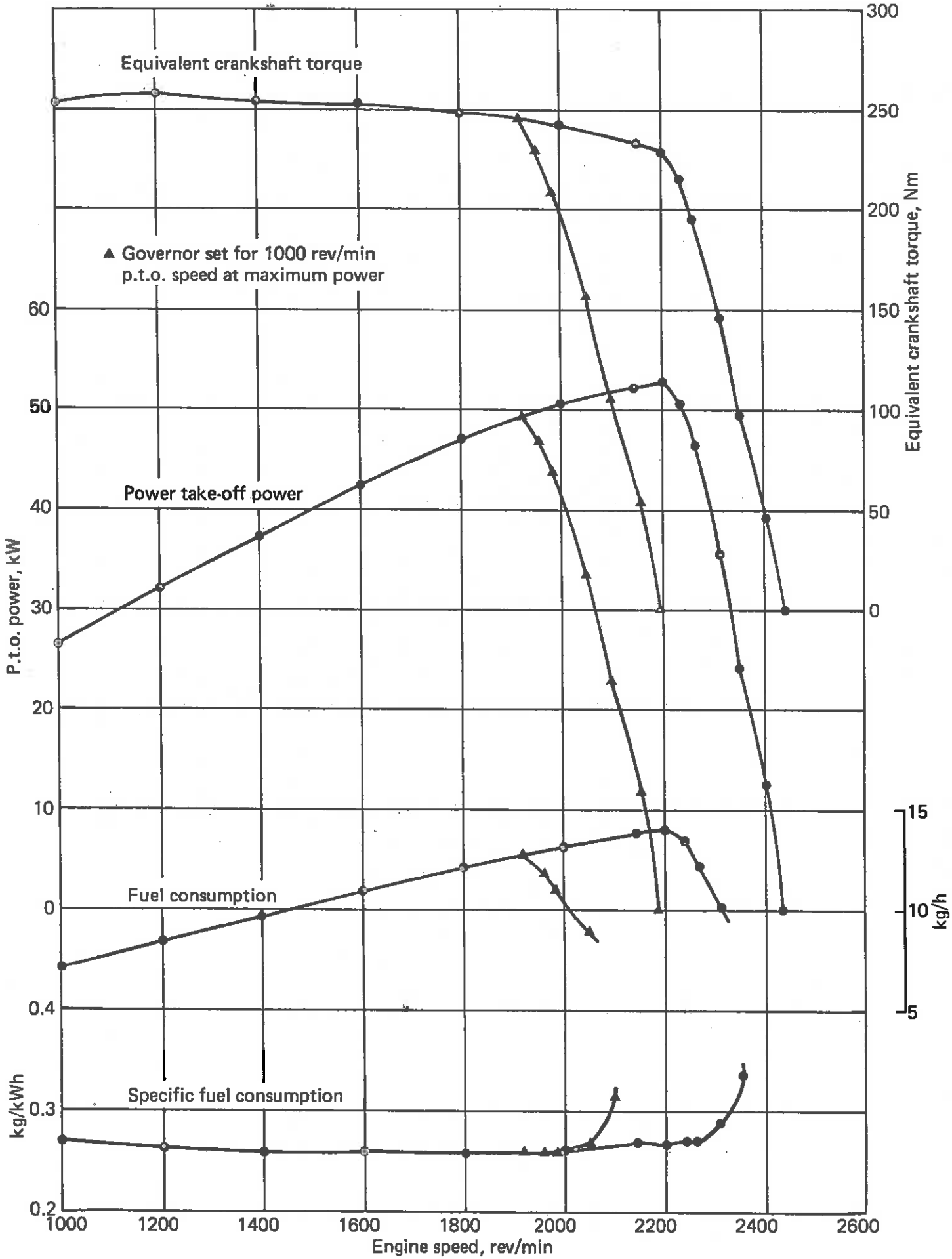
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (1000 rev/min).

Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly,		Specific,	Specific energy,
	Engine	P.t.o.	l/h (UKgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	kWh/l (hph/UKgal)
(1) 85% of the torque obtained at maximum power						
43.3 (58.1)	1985	1034	13.10 (2.88)	11.16 (24.60)	0.258 (0.423)	3.31 (20.2)
(2) Unloaded						
0	2198	1145	4.45 (0.98)	3.79 (8.36)	-	-
(3) 50% of the torque defined in (1)						
22.9 (30.7)	2100	1094	8.43 (1.86)	7.18 (15.83)	0.313 (0.515)	2.72 (16.6)
(4) The torque corresponding to maximum power at standard p.t.o. speed						
49.3 (66.1)	1920	1000	14.92 (3.28)	12.70 (28.01)	0.258 (0.424)	3.31 (20.1)
(5) 25% of the torque defined in (1)						
11.8 (15.8)	2160	1125	6.24 (1.37)	5.31 (11.72)	0.451 (0.741)	1.89 (11.5)
(6) 75% of the torque defined in (1)						
33.6 (45.0)	2050	1068	10.60 (2.33)	9.02 (19.90)	0.269 (0.442)	3.17 (19.3)

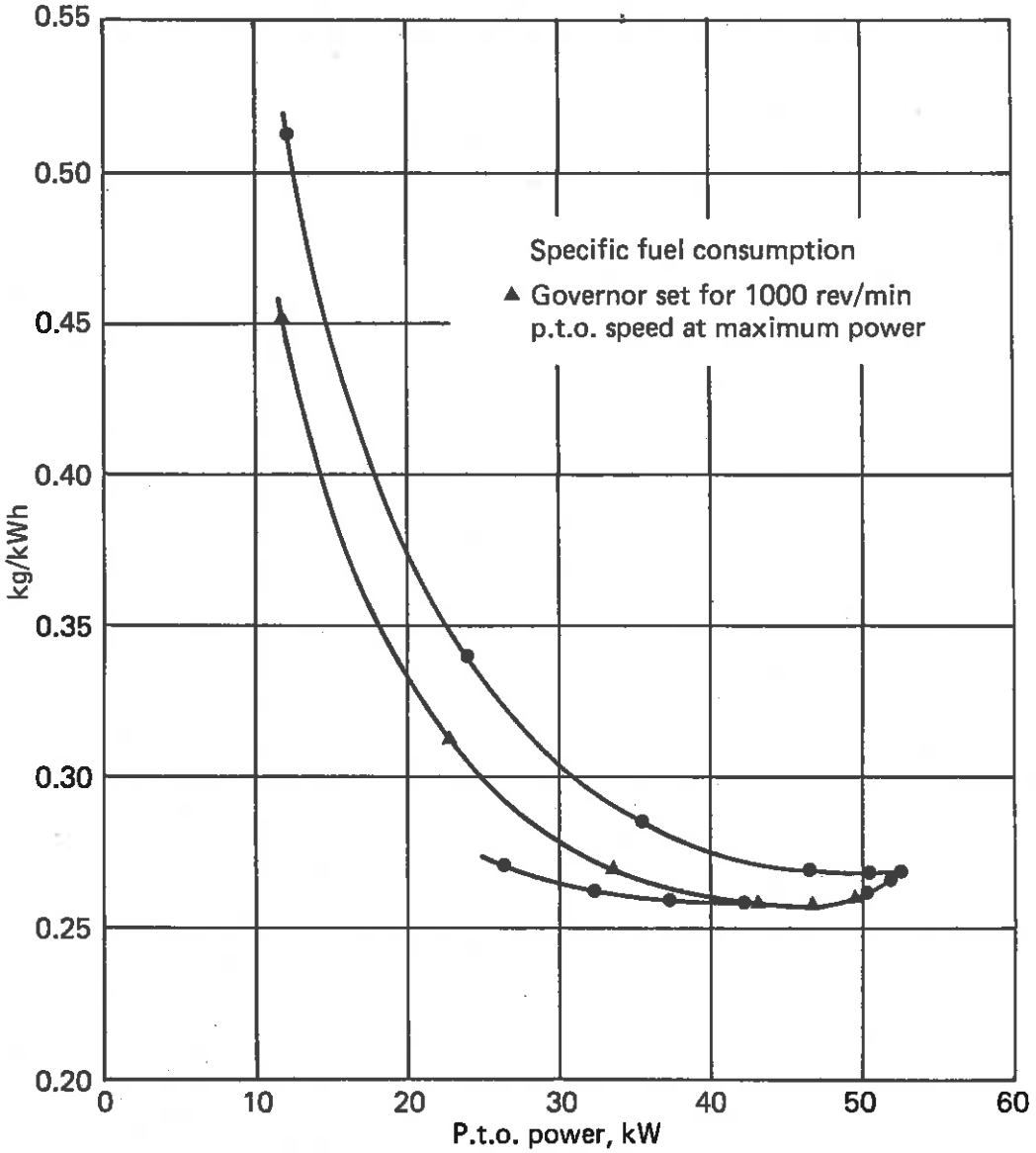
Standard specific fuel consumption, kg/kWh (lb/hph)

(a) 0.268(0.440) (b) 0.338(0.556) (c) 0.258(0.423) (d)0.313(0.515)

No load, maximum engine speed		2440 rev/min
Equivalent crankshaft torque at maximum power		229.4 Nm (169.2 lb ft)
Maximum equivalent crankshaft torque		257.2 Nm (189.7 lb ft) at 1200 rev/min engine speed
Mean atmospheric conditions	temperature	19°C (66°F)
	pressure	1028 m bar (30.36 in Hg)
	relative humidity	35%
Maximum temperature	coolant	84°C (183°F)
	engine oil	100°C (212°F)
	fuel	47°C (117°F)
	air intake	23°C (73°F)



Power take-off test



Power take-off test

2 DRAWBAR PERFORMANCE

Date of tests: 20th March–12th April 1984
Type of track: Concrete

Height of drawbar above ground: Unballasted: 340 mm (13.8 in)
Ballasted: 330 mm (13.2 in)

Gear	Speed, km/h (mile/h)	Power, kW (hp)	Drawbar pull, kN (lb)	Engine speed, rev/min	Wheel-slip, %	Specific fuel consumption, kg/kWh (lb/hph)	kWh/l (hph/UKgal)	Temperature, °C (°F) Fuel	Coolant	Engine oil	Atmospheric conditions Temperature, °C(°F)	Relative humidity %	Pressure, m bar (in Hg)
(i)	MAXIMUM POWER (unballasted)							Tyre inflation pressure: front 120 kPa (18 lb/in²) rear 80 kPa (12 lb/in²)					
L3M	4.02 (2.50)	*32.0 (42.9)	28.6 (6430)	2287	15.0	-	-	26 (79)	70 (159)	85 (186)	7 (45)	54	1010 (29.84)
H1M	4.65 (2.89)	*37.0 (49.6)	28.6 (6430)	2256	15.0	-	-	28 (82)	76 (170)	88 (191)	8 (46)	55	1010 (29.84)
L3	5.26 (3.27)	41.5 (55.7)	28.5 (6390)	2210	14.7	-	-	28 (82)	73 (164)	88 (191)	6 (44)	56	1010 (29.84)
L4M	5.68 (3.53)	43.3 (58.1)	27.5 (6170)	2194	12.6	-	-	27 (82)	73 (164)	89 (193)	7 (44)	54	1010 (29.84)
H1	6.44 (4.00)	44.3 (59.5)	24.8 (5570)	2200	10.0	-	-	29 (84)	74 (165)	90 (195)	7 (44)	54	1009 (29.82)
H2M	7.81 (4.85)	45.3 (60.8)	20.9 (4690)	2209	7.6	-	-	29 (84)	81 (178)	91 (197)	7 (44)	53	1009 (29.82)
L4	8.16 (5.07)	45.3 (60.8)	20.0 (4490)	2213	7.0	-	-	30 (86)	78 (172)	92 (198)	7 (44)	51	1009 (29.82)
H2	10.64 (6.61)	46.6 (62.4)	15.7 (3540)	2194	5.2	-	-	30 (86)	78 (174)	92 (198)	7 (44)	55	1009 (29.82)
H3M	12.83 (7.97)	46.4 (62.2)	13.0 (2920)	2203	4.2	-	-	29 (84)	82 (181)	91 (196)	7 (44)	56	1009 (29.82)

2 DRAWBAR PERFORMANCE continued

Gear	Speed, km/h (mile/h)	Power, kW (hp)	Drawbar pull, kN (lb)	Engine speed, rev/min	Wheel-slip, %	Specific fuel consumption, kg/kWh (lb/hph)	kWh/l (hph/UKgal)	Temperature, °C (°F) Fuel	Coolant	Engine oil	Atmospheric conditions Temperature, °C (°F)	Relative humidity %	Pressure, m bar (in Hg)
(ii) MAXIMUM POWER (ballasted) Tyre inflation pressure: front 120 kPa (18 lb/in²), rear 110 kPa (16 lb/in²)													
L1M	1.66 (1.03)	*17.6 (23.6)	38.4 (8640)	2355	15.0	0.442 (0.727)	1.92 (11.7)	40 (105)	74 (164)	84 (183)	9 (49)	37	998 (29.48)
L1	2.20 (1.37)	*23.5 (31.5)	38.4 (8640)	2327	15.0	0.392 (0.645)	2.16 (13.2)	38 (101)	74 (164)	85 (185)	9 (49)	33	998 (29.48)
L2M	2.53 (1.57)	*27.0 (36.2)	38.4 (8640)	2308	15.0	0.376 (0.619)	2.25 (13.7)	37 (99)	73 (164)	85 (185)	9 (49)	35	998 (29.48)
L2	3.36 (2.09)	*35.9 (48.1)	38.4 (8640)	2242	15.0	0.356 (0.586)	2.38 (14.5)	40 (105)	74 (164)	84 (183)	9 (49)	40	1003 (29.62)
L3M	3.92 (2.44)	41.6 (55.7)	38.1 (8570)	2211	14.5	0.345 (0.568)	2.45 (14.9)	39 (102)	78 (172)	86 (187)	9 (49)	36	997 (29.46)
H1M	4.78 (2.97)	44.3 (59.4)	33.3 (7490)	2207	10.5	0.326 (0.536)	2.60 (15.8)	38 (100)	78 (172)	89 (193)	9 (49)	34	996 (29.44)
L3	5.65 (3.51)	44.1 (59.1)	28.1 (6310)	2210	7.8	0.325 (0.534)	2.61 (15.9)	40 (105)	80 (176)	91 (196)	10 (50)	35	996 (29.44)
L4M	6.00 (3.73)	45.4 (60.9)	27.2 (6110)	2196	7.2	0.316 (0.520)	2.67 (16.3)	39 (102)	78 (172)	92 (198)	9 (49)	31	996 (29.44)
H1	6.65 (4.13)	45.4 (60.9)	24.6 (5520)	2198	6.6	0.316 (0.520)	2.68 (16.3)	40 (104)	80 (176)	92 (198)	9 (49)	36	999 (29.52)
H2M	7.89 (4.91)	45.9 (61.5)	20.9 (4700)	2200	5.3	0.313 (0.515)	2.70 (16.5)	41 (106)	81 (178)	92 (198)	9 (49)	37	1000 (29.53)
L4	8.30 (5.16)	45.1 (60.4)	19.5 (4390)	2209	5.0	0.321 (0.527)	2.64 (16.1)	39 (102)	80 (176)	93 (199)	9 (49)	35	997 (29.46)
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
H1	7.06 (4.39)	36.2 (48.6)	18.5 (4150)	2272	3.2	0.315 (0.519)	2.68 (16.4)	39 (102)	88 (191)	91 (196)	10 (50)	40	1018 (30.07)
(iv) + FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
L2	3.57 (2.22)	38.1 (51.1)	38.4 (8640)	2245	-	-	-	37 (99)	89 (193)	92 (198)	8 (46)	44	1020 (30.14)

Total oil consumption during ten hours duration of tests (iii) and (iv) 36.0 g/h (0.0792 lb/h)

*Maximum power available at 15% wheelslip

+Test (iv) was carried out with additional ballast and the results for power, slip and fuel consumption have no practical significance.

3. TURNING SPACE AND TURNING CIRCLE (Front wheel drive engaged)

Details of wheel equipment: As in specification, without ballast

Track of wheels: front - 1530 mm (60.2 in)

rear - 1500 mm (59.1 in)

	With brakes		Without brakes	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)	3.75 (148)	3.54 (139)	4.19 (165)	4.01 (158)
Radius of turning circle, m (in)	3.61 (142)	3.40 (134)	4.05 (159)	3.87 (152)

4. LOCATION OF CENTRE OF GRAVITY

Height above ground, mm (in)	966 (38.0)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	780 (30.7)
Distance from the median plane of the tractor, mm (in)	0

5. BRAKING

Date of tests: 2nd and 9th May 1984

Type of track: Concrete

Masses during brake tests

	Front, kg (lb)	Rear, kg (lb)	Total, kg (lb)
Ballasted	1700 (3748)	5040 (11111)	6740 (14859)
Unballasted	1362 (3003)	2778 (6124)	4140 (9127)

Tyres: As in specification

Type 0 Service brakes (cold)

Travelling speed before application of brakes, 27.3 km/h (17.0 mile/h)

Ballasted	Force on brake pedal	N (lb)	360 (81)	400 (90)	440 (99)	480 (108)	520 (117)	560 (126)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	1.2 (3.9)	1.5 (4.9)	1.9 (6.2)	2.2 (7.2)	2.5 (8.2)	2.9 (9.5)	3.2 (10.5)
Unballasted	Force on brake pedal	N (lb)	320 (72)	360 (81)	400 (90)	440 (99)	480 (108)	520 (117)	550 (124)
	Mean deceleration	m/s^2 (ft/s^2)	1.0 (3.3)	1.4 (4.6)	1.9 (6.2)	2.3 (7.5)	2.8 (9.2)	3.3 (10.8)	3.6 (11.8)

Type 1 Service brakes (hot)

Ballasted	Force on brake pedal	N (lb)	360 (81)	400 (90)	440 (99)	480 (108)	520 (117)	560 (126)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	0.9 (3.0)	1.1 (3.6)	1.4 (4.6)	1.7 (5.6)	1.9 (6.2)	2.2 (7.2)	2.5 (8.2)

Brakes were heated by: Towing

Comments on deviation and vibration: None

Parking brake:

		Force applied on slope of 18%		force applied on slope of 12% with trailer of 3 tonnes (6614 lb)	
		Up	Down	Up	Down
Pull on handbrake	N (lb)	178 (40)	178 (40)	133 (30)	133 (30)

6. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 6th June 1984
Type of sound level meter: Bruel and Kjaer 2209
Type of track: Concrete
Results of tests
Gear: H4
Travelling speed before acceleration: 20.5 km/h (12.7 mile/h)
Sound level: 89 dBA

7. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 1st March 1984
Type of sound level meter: Bruel and Kjaer 2209
Type of track: Concrete
Cab fitted: Yes

Results of tests:

Gear	Drawbar pull at which the tractor develops maximum sound level, kN (lb)	Measured travelling speed, km/h (mile/h)	Sound level, dBA
All openings closed with cab fitted			
* H1	17 (3820)	7.1 (4.4)	84
* H1	Light load	7.9 (4.9)	82
L2M	28 (6290)	3.2 (2.0)	85
L4M	17 (3820)	6.8 (4.2)	86
H4	Light load	27.3 (17.0)	84

* The H1 gear corresponds to the nominal travelling speed nearest to 7.5 km/h (4.7 mile/h).

8. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: 21st May and 23rd May 1984
Hydraulic fluid:

Make and type: PP 80
Viscosity: 44.2 cSt at 50°C (122°F)

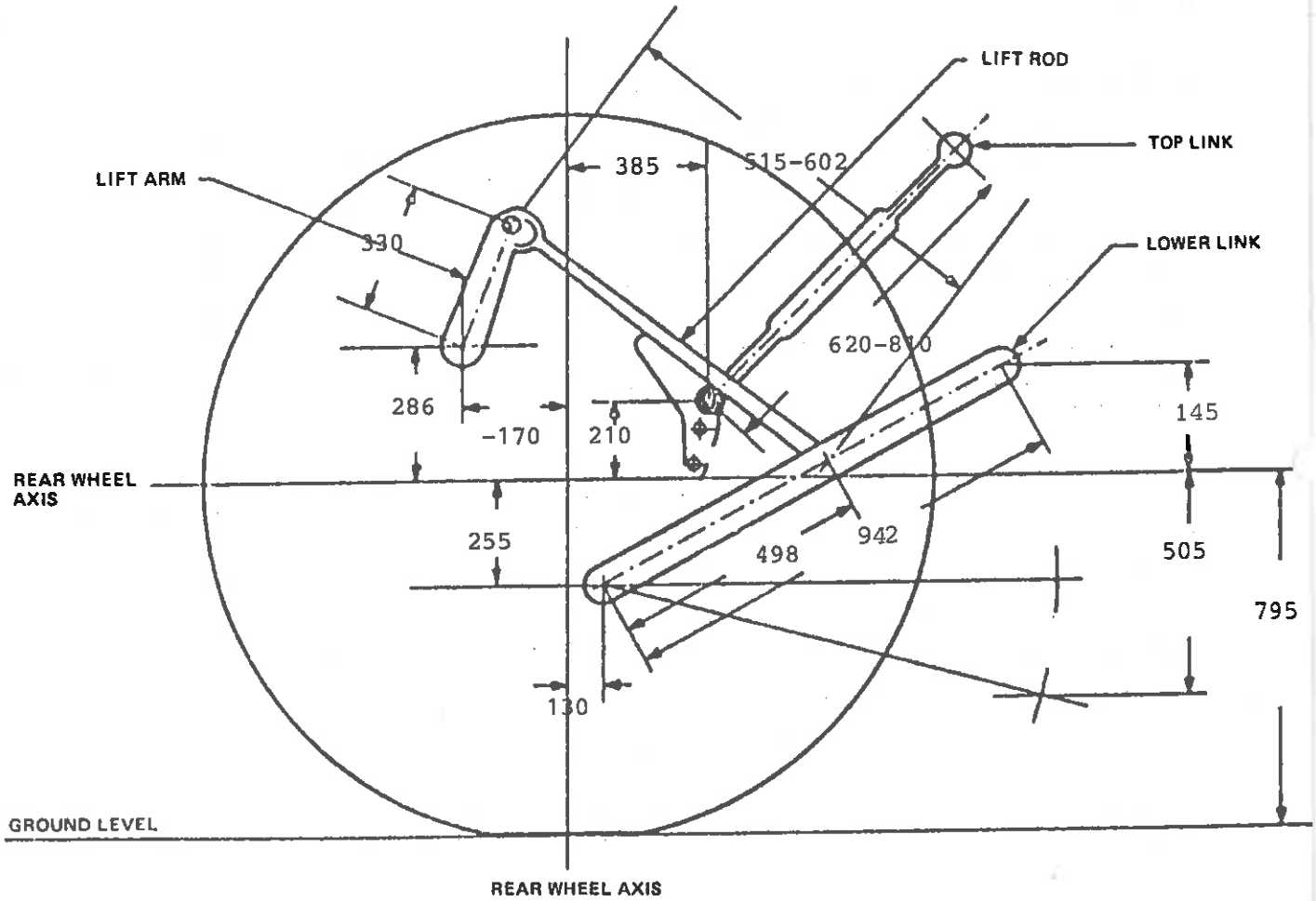
Type of linkage lock for transport: Hydraulic

Power lift

	Height of lower hitch point above ground in down position, mm (in)	Vertical movement, mm (in)	Maximum force exerted through full range, kN (lb)	Corresponding pressure of hydraulic fluid MPa (lb/in^2)	Moment about rear axle, kNm (lb/ft)	Maximum tilt angle of mast over range of lift, degrees
At the hitch points	290 (11.4)	650 (25.6)	35.0 (7870)	16.7 (2420)	37.5 (27659)	-
On the frame	290 (11.4)	740 (29.1)	27.5 (6180)	16.7 (2420)	46.3 (34149)	11

Power lift

Dimensions of linkage geometry, mm



Linkage geometry when connected to the standard frame, mm (in)

Projected length in side view		
Lower links	942	(37.1)
Lift arms	330	(13.0)
Lift rods	559	(22.0)
Top link	683	(26.9)
Distance of lift rod connection point from pivot point of lower link	498	(19.6)
The following dimensions are given relative to the rear wheel centre line, situated 795 mm (31.3 in) above the ground level		
Lower link pivot point	130 (5.1) behind, 255 (10.0) below	
Top link pivot point	385 (15.2) behind, 210 (8.3) above	
Lift arm pivot point	170 (6.7) behind, 286 (11.3) above	
Maximum and minimum height of lower link hitch points	145 (5.7) above, 505 (19.9) below	
Height of lower link hitch points when locked in transport position	Any height within lift range	

Hydraulic pump performance

Opening pressure of the relief valve:	16.0 MPa (2320 lb/in^2)
Sustained pressure with relief valve open:	19.0 MPa (2740 lb/in^2)
Opening pressure of the unloading valve:	Not applicable
Closing pressure of the unloading valve:	Not applicable
Pump delivery rate at minimum pressure, the governor control lever set for maximum power:	48.6 l/min (10.7 gal/min)
Pressure specified by the manufacturer for an external hydraulic motor:	16.0 MPa (2320 lb/in^2)
Hydraulic power at 90% of relief valve setting at 16.7 MPa (2422 lb/in^2):	11.7 kW (15.7 hp)
Pump delivery rate at stated power:	46.0 l/min (10.1 gal/min)
Tapping point:	Auxilliary service connection
Temperature of hydraulic fluid:	63°C (145°F

REPAIRS AND ADJUSTMENTS DURING TESTS: A fractured injector pipe was replaced.

REMARKS: None

Test carried out by: N.R. Baker : J.P. Evans : P.A. Pope

Officer in charge: F. Thistlethwaite

Signed: D.W. Smith Head of Tractor Test Section

for the Director

Date: 21/8/84