OECD Approval No. 908

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

Report on test of Zetor 12111 Tractor with Two-Wheel Drive



Manufactured by	Zavody Tazkeho Strojarstva, Narodny Podnik, Box 03657 Martin, Czechoslavakia.
Test No.	R84/70331/OECD
Report No.	699
Date	August 1984

THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

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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 12111
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 8701.1
Type:	4 stroke, direct injection diesel
Serial No.:	000 002

Cylinders

Number/disposition:	6, vertical in line
Bore/stroke:	110 mm x 120 mm (4.3 in x 4.7 in)
Capacity:	6842 cm^3 (417 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:	195 l (42.9 UK gal)

Fuel system (cont:)

Make, type and model of injection pump:	Motorpal, in line, PP6 M85 KLE
Serial No:	VN 1450
Manufacturer's production setting of injection pump, flow rate and timing:	23.4 - 26.25 l/h (41.2-46.2 pt/h) at 2200 rev/min engine speed 24° + 2° 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 500
Location:	Under bonnet forward of radiator
Main	
Make:	Sandrik
Type:	Oilbath
Model:	9450.11
Oil capacity:	2.1 l (3.7 pt)
Location:	Under bonnet forward of radiator
Maintenance indicator:	None

Lubrication system

Type of feed pump:	Gear
Total oil capacity including filter(s):	19.0 l (33.4 pt)
Oil change period:	200 hours
Type of filter(s)	Centrifugal, replaceable element
Number:	1
Filter(s) 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:	8
Fan diameter:	460 mm (18.1 in)
Coolant capacity:	23 l (40.5 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:	Polmo-Elmot
Type:	Electrical, solenoid engaged
Model and starter motor power rating:	R20E, 24V, 5.5 kW (7.4 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 in)

TRANSMISSION

Clutch

Make:	Z.T.S.
Type:	Dry, for transmission only
Number of plates:	1
Diameter of plate:	380 mm (15.0 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:	ZPC Ursus

Transmission oils

Capacity	
Gear box and transmission housing:	53.5 l (94.2 pt) including oil for hydrauli
Change period:	1200 hours
Filter change period:	600 hours
Final drive(s):	2 x 4 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			
L1M	348.34	1.95	(1.21)
L1	260.40	2.61	(1.62)
L2M	221.03	3.08	(1.92)
L2	165.20	4.12	(2.56)
L3M	139.10	4.89	(3.04)
H1M	119.41	5.70	(3.54)
L3	103.98	6.54	(4.06)
L4M	97.71	6.96	(4.33)
H1	89.26	7.62	(4.74)
H2M	76.04	8.94	(5.56)
L4	73.03	9.31	(5.79)
H2	56.63	12.01	(7.46)
H3M	47.68	14.26	(8.86)
H3	35.64	19.08	(11.86)
H4M	33.50	20.30	(12.62)
H4	25.04	27.16	(16.88)
Reverse			
1M	254.75	2.67	(1.66)
1	190.42	3.57	(2.22)
2M	161.63	4.21	(2.61)
2	120.82	5.63	(2.61)
3M	101.72	6.69	(3.50)
3	76.04	8.94	(4.15)
4M	71.45	9.52	(5.56)
4	53.40	12.74	(7.91)

M = Torque Multiplier engaged

Rear tyre size: 18.4-38
Tyre loaded radius: 820 mm (32.3 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 ISO standard
Height above ground:	667 mm (26.3 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 end:	34.9 mm (1.375 in)
Number of splines:	21 to ISO standard
Height above ground:	667 mm (26.3 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:	18.4-38
Travelling distance for one revolution of power take-off shaft:	188 mm (7.4 in)
Number of pto shaft revolutions for one revolution 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 (2680-2830 lb/in^2)
Opening pressure of cylinder safety valve;	18.5-19.5MPa (2680-2830 lb/in^2)
Lift pump type:	Gear, PZ 2-18KS
Transmission between pump and engine;	Gear driven
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)

THREE POINT LINKAGE

Category:	2 to ISO standard
Controls:	Draught or position control lower link sensing, adjustable speed on drop

DRAWBAR

Swinging

Height above ground maximum:	415 mm (16.3 in)
minimum:	332 mm (13.1 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:	335 and 252 mm (13.2 and 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:	1070 mm (42.1 in)
minimum:	170 mm (6.7 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 in x 3.5 in)

Trailer hitch

Height above ground, maximum:	842 mm (33.1 in)
minimum:	692 mm (27.2 in)
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 (7.1 in)
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 of 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/in²)
Oil capacity:	8.0 l (14.1 pt)
Oil change period:	1200 hours
Filter(s) change period:	1200 hours
Recommended oil:	S.A.E. 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 (1870 lb)
Corresponding inflation pressure:	250 kPa (36 lb/in²)
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:	18.4-38
Ply rating:	8
Type of casing:	Cross ply
Maximum permissible load on each tyre:	2715 kg (5980 lb)
Corresponding inflation pressure:	140 kPa (20 lb/in²)
Track widths:	1725-1875 mm (68-74 in)
Method of adjustment:	Reversing wheels and off-set lug rim

WHEELBASE 2700 mm (106.3 in)

PROTECTIVE STRUCTURE SPECIFICATIONS

OECD approval number:	None
Trade name:	Zetor BK 12111
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°

	Height above ground of centre, mm (in)	Size mm (in)	Distance from outside edge of tractor to centre, at 1725 mm (67.9 in) track width mm (in)
Headlights	1110 (43.7)	124 (4.9) dia	912 (35.9)
Sidelights	1809 (71.2)	5.5 x 50 (2.2 x 2.0)	65 (2.6)
Rear lights	1640 (64.6)	105 x 75 (4.1 x 3.0)	260 (10.2)
Reflectors	1150 (45.3)	80 (3.1) dia	35 (1.4)

TEST CONDITIONS

Overall dimensions

(front: 7.50-20, rear: 18.4-38 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	4.780 (188.2)	2.190 (86.2)	2.280 (89.8)	2.635 (103.7)	2.695 (106.1)
Without ballast	4.665 (183.7)	2.190 (86.2)	2.280 (89.8)	2.640 (103.9)	2.700 (106.3)

Ground clearance

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

Track setting

Front: 1550 mm (61.0 in)
Rear: 1725 mm (67.9 in)

Tractor mass and ballasting

Tractor mass
(without driver but with tanks full - with cab)

		Front	Rear	Total
Without ballast	kg	1443	2953	4396
	(lb)	(3182)	(6510)	(9692)
With ballast	kg	1443	4146	5589
	(lb)	(3182)	(9142)	(12324)

Ballast

	Weights		Water kg (lb)
	Number	kg (lb)	
Front	Nil	Nil	Nil
Rear	8	334 (736)	859 (1894)
Additional	Nil	Nil	

Fuel and lubricants used in tests

Fuel

Diesel oil to Class D British Standard 2869: 1970
Specific gravity at 15° C: 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 or L-2104C	L-45199B 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: 28th February 1984, NIAE, Silsoe. Bedford, UK.

Type of dynamometer: Water brake, Heenan and Froude

Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly,		Specific, kg/kWh (lb/hph)	Specific energy, kWh/l (hph/UKgal)
	Engine	P.t.o.	l/h (UKgal/h)	kg/h (lb/h)		
MAXIMUM POWER - 2 HOUR TEST						
75.3 (101.0)	2200	1146	23.73 (5.22)	20.24 (44.63)	0.269 (0.442)	3.18 (19.4)
POWER AT RATED ENGINE SPEED						
75.3 (101.0)	2200	1146	23.73 (5.22)	20.24 (44.63)	0.269 (0.442)	3.18 (19.4)
POWER AT STANDARD POWER TAKE-OFF SPEED						
69.9 (93.8)	1920	1000	21.11 (4.64)	17.98 (39.64)	0.257 (0.422)	3.31 (20.2)
PART LOADS						
(1) 85% of the torque obtained at maximum power at rated engine speed						
65.4 (87.8)	2266	1180	20.60 (4.53)	17.54 (38.67)	0.268 (0.440)	3.17 (19.3)
(2) Unloaded						
0	2430	1265	7.49 (1.64)	6.38 (14.06)	-	-
(3) 50% of the torque defined in (1)						
34.2 (45.8)	2357	1228	13.68 (3.01)	11.64 (25.68)	0.341 (0.560)	2.49 (15.2)
(4) The torque corresponding to maximum power at rated engine speed						
75.3 (101.0)	2200	1146	23.73 (5.22)	20.24 (44.63)	0.269 (0.442)	3.18 (19.4)
(5) 25% of the torque defined in (1)						
17.3 (23.2)	2382	1240	10.42 (2.29)	8.87 (19.56)	0.512 (0.841)	1.66 (10.1)
(6) 75% of the torque defined in (1)						
50.1 (67.1)	2310	1203	17.01 (3.74)	14.48 (31.93)	0.289 (0.475)	2.94 (17.9)

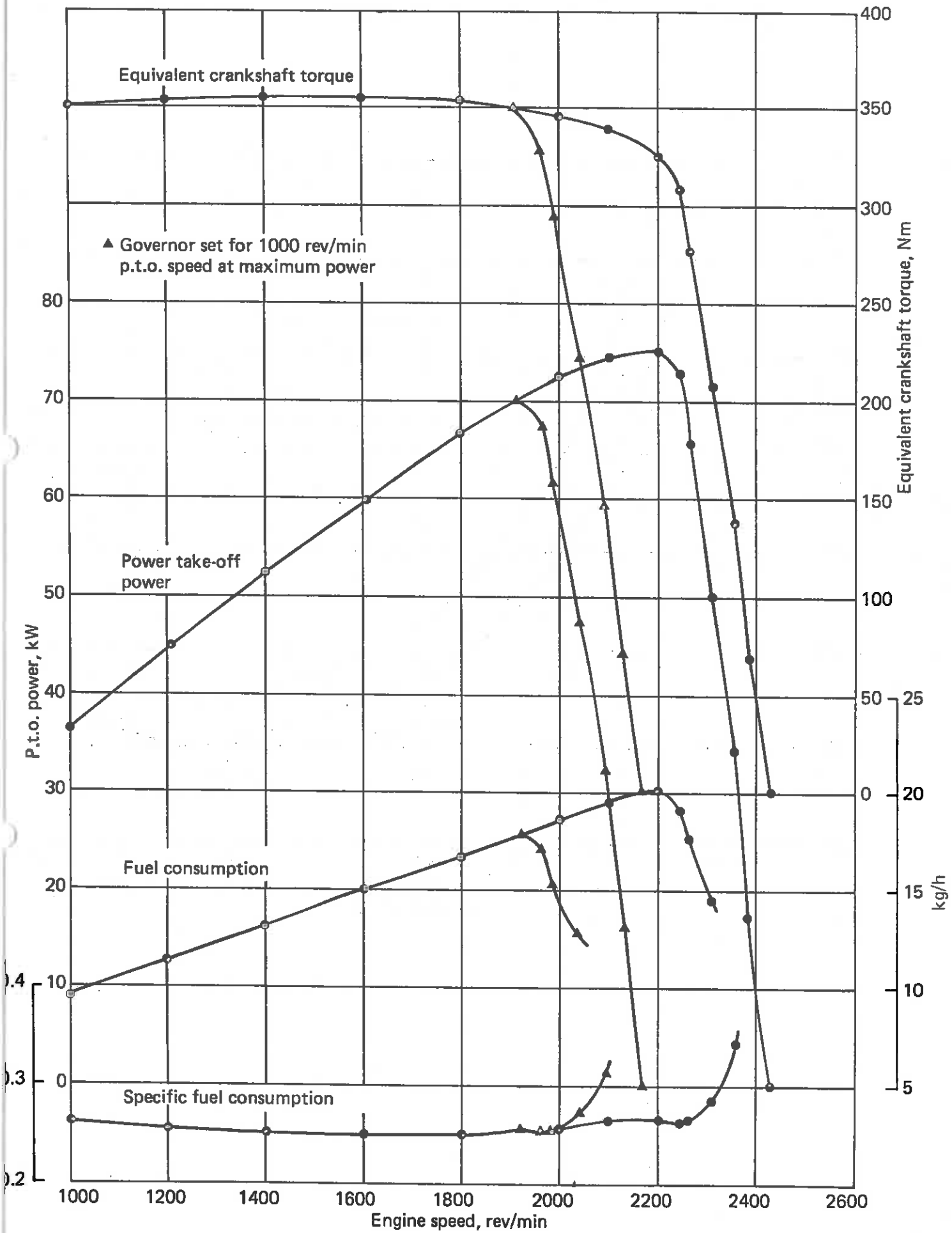
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load. (1000 rev/min)

Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly, l/h (UKgal/h)	Hourly, kg/h (lb/h)	Specific, kg/kWh (lb/hph)	Specific energy, kWh/l (hph/UKgal)
	Engine	P.t.o.				
(1) 85% of the torque obtained at maximum power						
61.3 (82.2)	1983	1033	18.13 (3.98)	15.43 (34.03)	0.251 (0.414)	3.38 (20.6)
(2) Unloaded						
0	2171	1130	5.98 (1.31)	5.1 (11.24)	-	-
(3) 50% of the torque defined in (1)						
32.3 (43.3)	2094	1090	11.86 (2.60)	10.09 (22.26)	0.312 (0.514)	2.72 (16.6)
(4) The torque corresponding to maximum power at standard p.t.o. speed						
69.9 (93.8)	1920	1000	21.11 (4.64)	17.98 (39.64)	0.257 (0.422)	3.31 (20.2)
(5) 25% of the torque defined in (1)						
16.1 (21.7)	2131	1110	8.77 (1.92)	7.46 (16.46)	0.462 (0.759)	1.84 (11.2)
6) 75% of the torque defined in (1)						
47.5 (63.7)	2040	1062	15.08 (3.31)	12.84 (28.32)	0.270 (0.444)	3.14 (19.1)

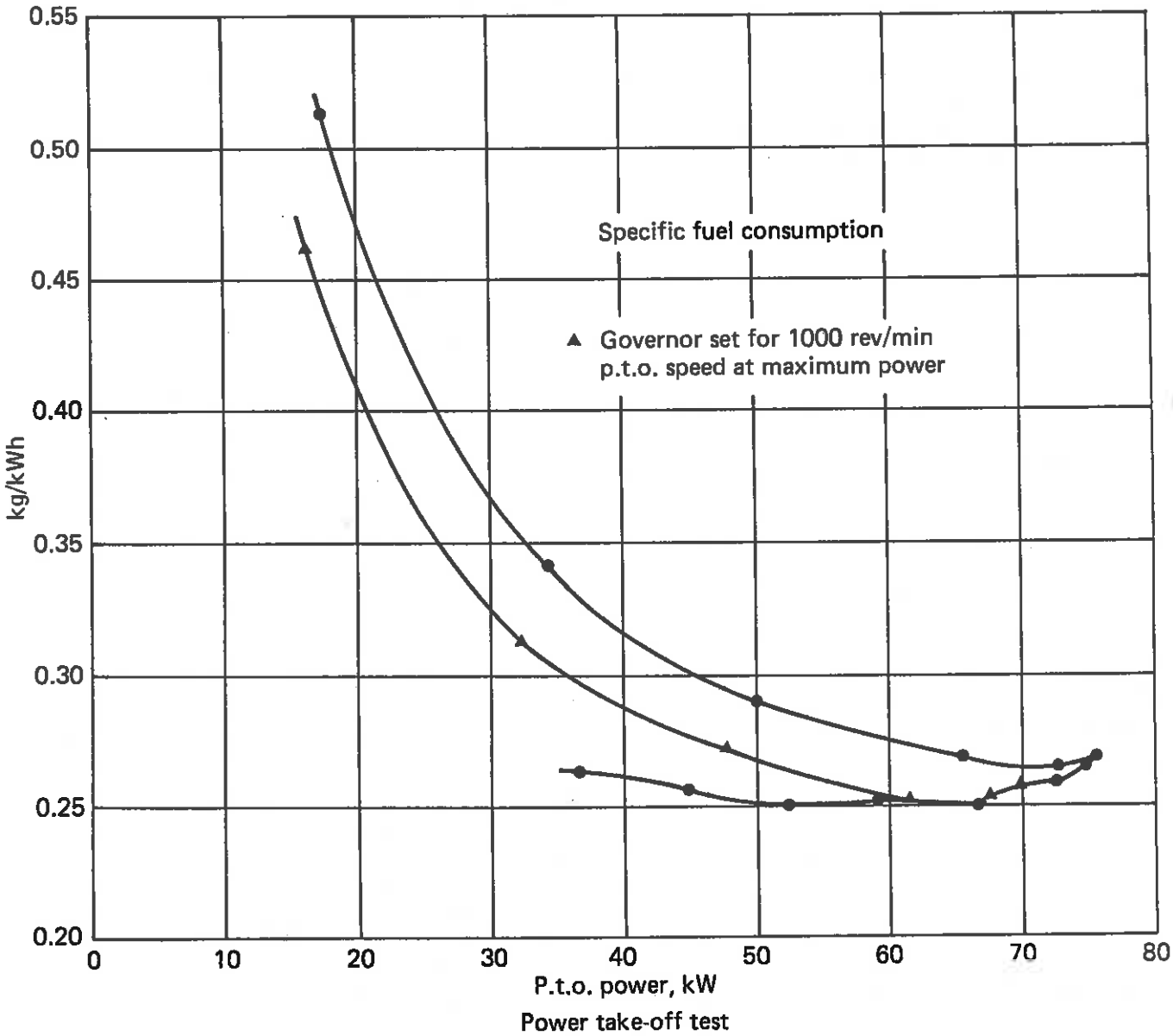
Standard specific fuel consumption, kg/kWh (lb/hph)

(a) 0.268(0.440) (b) 0.341(0.560) (c) 0.251(0.414) (d) 0.312(0.514)

No load, maximum engine speed		2430 rev/min
Equivalent crankshaft torque at maximum power		326.0 Nm (240.4 lb ft)
Maximum equivalent crankshaft torque		359.7 Nm (265.3 lb ft) at 1460 rev/min engine speed
Mean atmospheric conditions	temperature	18°C (64°F)
	pressure	1016 m bar (30.00 in Hg)
	relative humidity	35%
Maximum temperature	coolant	85°C (185°F)
	engine oil	94°C (201°F)
	fuel	49°C (120°F)
	air intake	25°C (77°F)



Power take-off test



Power take-off test

2 DRAWBAR PERFORMANCE

Date of tests: 18th-22nd June 1984
Type of track: Concrete

Height of drawbar above ground: Unballasted: 420 mm (16.5 in)
Ballasted: 390 mm (15.4 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/in^2), rear 80 kPa (12 lb/in^2)													
L4M	5.94 (3.69)	54.8* (73.5)	33.0 (7420)	2249	15.0	-	-	45 (114)	72 (162)	88 (191)	19 (66)	56	1025 (30.27)
H1	6.38 (3.96)	58.5* (78.4)	33.0 (7420)	2229	15.0	-	-	45 (114)	73 (164)	89 (192)	19 (66)	56	1025 (30.27)
H2M	7.84 (4.87)	61.7 (82.7)	28.3 (6360)	2205	11.0	-	-	44 (112)	73 (164)	89 (192)	19 (66)	57	1025 (30.27)
L4	8.23 (5.11)	62.4 (83.6)	27.3 (6130)	2207	10.5	-	-	45 (114)	74 (165)	89 (192)	19 (66)	56	1025 (30.27)
H2	11.02 (6.85)	64.9 (87.0)	21.2 (4760)	2210	7.7	-	-	45 (114)	76 (169)	89 (192)	19 (66)	58	1025 (30.27)
H3M	13.25 (8.23)	66.0 (88.5)	17.9 (4030)	2205	6.5	-	-	45 (114)	76 (169)	89 (192)	19 (66)	55	1025 (30.27)

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)	Specific fuel consumption, 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/in^2), rear 90 kPa (13 lb/in^2)													
L1M	1.74 (1.08)	21.7* (29.1)	45.0 (10120)	2354	15.0	0.469 (0.771)	1.80 (11.0)	46 (116)	75 (167)	89 (192)	22 (72)	52	1017 (30.04)
L1	2.28 (1.42)	28.5* (38.2)	45.0 (10120)	2338	15.0	0.414 (0.681)	2.04 (12.5)	48 (119)	74 (165)	90 (194)	23 (73)	51	1017 (30.04)
L2M	2.70 (1.68)	33.5* (45.0)	45.0 (10120)	2323	15.0	0.383 (0.630)	2.21 (13.5)	48 (119)	72 (163)	89 (192)	22 (72)	53	1017 (30.04)
L2	3.52 (2.19)	44.1* (59.2)	45.0 (10120)	2283	15.0	0.354 (0.583)	2.39 (14.6)	48 (119)	74 (165)	89 (192)	22 (72)	49	1017 (30.04)
L3M	4.19 (2.60)	52.4* (70.1)	45.0 (10120)	2266	15.0	0.340 (0.559)	2.49 (15.2)	46 (116)	73 (164)	87 (189)	20 (69)	53	1017 (30.04)
H1M	4.80 (2.98)	60.0* (80.5)	45.0 (10120)	2215	15.0	0.343 (0.564)	2.47 (15.1)	46 (116)	76 (169)	84 (184)	20 (69)	56	1017 (30.04)
L3	5.65 (3.51)	60.9 (81.7)	38.8 (8720)	2206	10.5	0.338 (0.556)	2.51 (15.3)	46 (116)	75 (167)	88 (191)	19 (67)	55	1018 (30.08)
L4M	6.13 (3.81)	63.5 (85.2)	37.3 (8380)	2209	9.8	0.321 (0.528)	2.63 (16.1)	47 (117)	77 (170)	89 (192)	22 (72)	48	1017 (30.04)
H1	6.77 (4.21)	64.3 (86.2)	34.2 (7680)	2203	8.6	0.318 (0.523)	2.66 (16.2)	48 (119)	75 (168)	89 (192)	22 (72)	49	1017 (30.04)
H2M	8.18 (5.08)	65.4 (87.6)	28.8 (6460)	2202	6.9	0.319 (0.524)	2.65 (16.2)	45 (113)	73 (164)	81 (178)	20 (68)	56	1017 (30.04)
L4	8.46 (5.26)	65.7 (88.1)	28.0 (6280)	2205	6.6	0.314 (0.517)	2.69 (16.4)	49 (120)	77 (171)	90 (194)	22 (72)	49	1016 (30.03)
H2	11.15 (6.93)	65.9 (88.4)	21.3 (4780)	2209	5.3	0.311 (0.512)	2.72 (16.6)	48 (119)	74 (165)	89 (192)	21 (71)	53	1016 (30.03)
H3M	13.35 (8.30)	66.1 (88.7)	17.8 (4000)	2200	4.7	0.318 (0.523)	2.66 (16.2)	45 (114)	75 (167)	89 (192)	21 (71)	55	1016 (30.03)
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
H1	7.36 (4.57)	52.7 (70.7)	25.7 (5770)	2303	5.4	0.314 (0.517)	2.69 (16.4)	41 (106)	69 (156)	88 (191)	14 (58)	57	1013 (29.92)
(iv)+ FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
H1M	5.06 (3.15)	-	45.0 (10120)	2245	-	-	-	43 (109)	74 (165)	88 (191)	14 (58)	66	1008 (29.78)

Total oil consumption during ten hours duration of tests (iii) and (iv) 34.0 g/h (0.0748 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

3. TURNING SPACE AND TURNING CIRCLE

Details of wheel equipment: As in specification, without ballast

Track of wheels: front - 1550 mm (61.0 in)
rear - 1730 mm (68.1 in)

	With brakes		Without brakes	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)	4.20 (165)	3.95 (156)	4.62 (182)	4.49 (177)
Radius of turning circle, m (in)	4.10 (161)	3.85 (152)	4.52 (178)	4.39 (173)

4. LOCATION OF CENTRE OF GRAVITY

Height above ground, mm (in)	1027 (40.4)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	907 (35.7)
Distance from the median plane of the tractor, mm (in)	0

5. BRAKING

Date of tests: 14th March and 26th June 1984

Type of track: Concrete

Masses during brake tests

	Front, kg (lb)	Rear, kg (lb)	Total, kg (lb)
Ballasted	1700 (3748)	5430 (11971)	7130 (15719)
Unballasted	1443 (3182)	2953 (6510)	4396 (9692)

Tyres: As in specification

Type 0 Service brakes (cold)

Travelling speed before application of brakes, 29.5 km/h (18.3 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)	1.8 (5.9)	2.0 (6.6)	2.3 (7.5)	2.6 (8.5)	2.8 (9.2)
Unballasted	Force on brake pedal	N (lb)	270 (61)	310 (70)	350 (79)	390 (88)	430 (97)	470 (106)	510 (115)
	Mean deceleration	m/s^2 (ft/s^2)	0.9 (3.0)	1.3 (4.3)	1.8 (5.9)	2.3 (7.5)	2.7 (8.9)	3.2 (10.5)	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)	1.1 (3.6)	1.3 (4.3)	1.6 (5.2)	1.8 (5.9)	2.0 (6.6)	2.2 (7.2)	2.4 (7.9)

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)	222 (50)	222 (50)	150 (34)	150 (34)

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: 22.1 km/h (13.7 mile/h)
Sound level: 90 dBA

7. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 9th 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	15 (3370)	7.7 (4.8)	86
*H1	Light load	8.3 (5.2)	83
L2	30 (6740)	4.2 (2.6)	87
L3	22 (4950)	6.6 (4.1)	87
H4	Light load	29.5 (18.3)	84

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

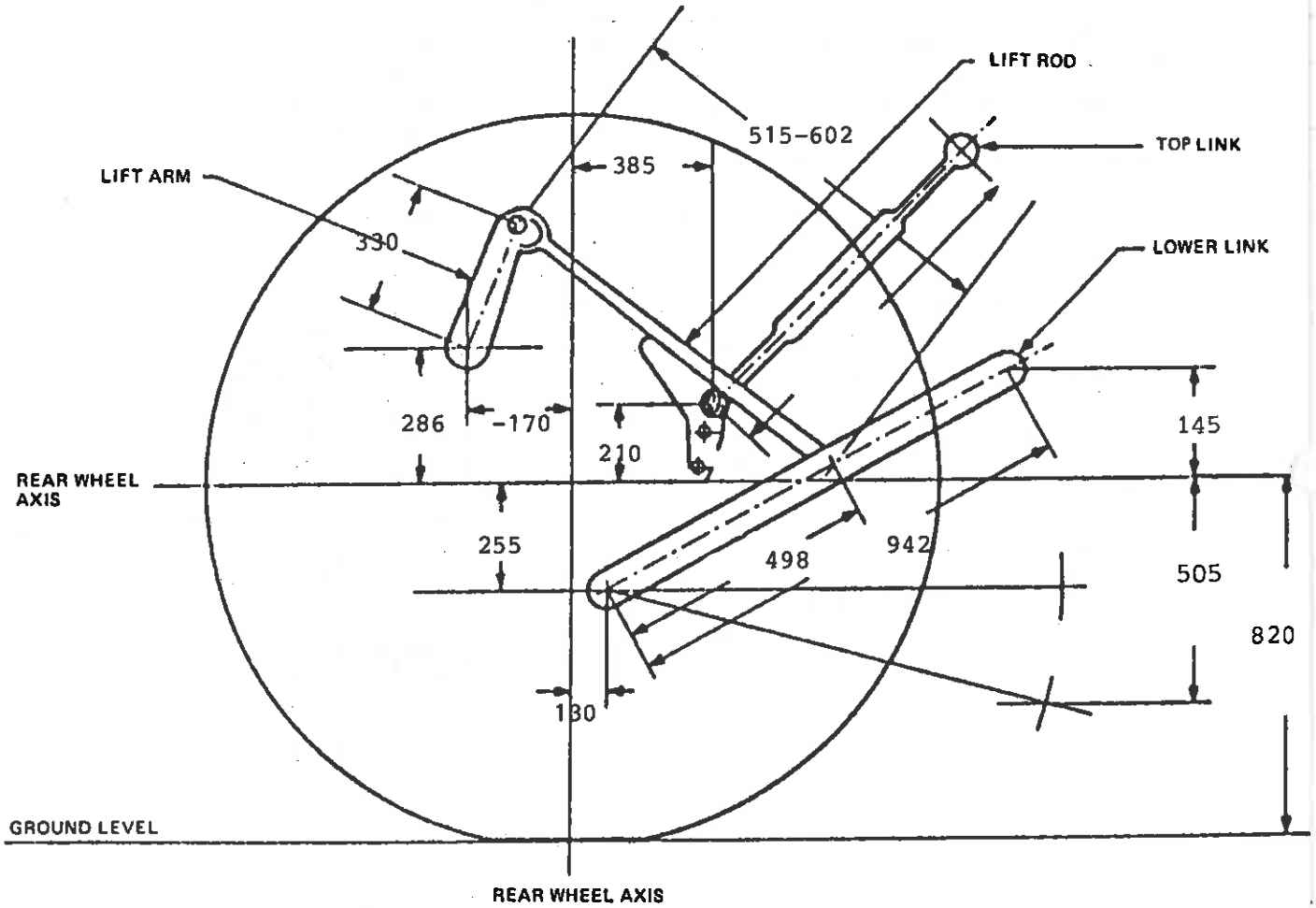
8. POWER LIFT AND HYDRAULIC PUMP PERFORMANCE

Date and location of tests: 15th May and 25th July 1984
Hydraulic fluid:
Make and type: PP 80
Viscosity: 44.2 cSt at 50°C (122°F)
Type of linkage 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	315 (12.4)	650 (25.6)	50.5 (11350)	16.7 (2420)	54.1 (39902)	-
On the frame	315 (12.4)	740 (29.1)	37.0 (8320)	16.7 (2420)	62.2 (45876)	11

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 820 mm (32.3 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/in²)
Sustained pressure with relief valve open:	19.3 MPa (2800 lb/in²)
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:	47.8 l/min (10.5 gal/min)
Pressure specified by the manufacturer for an external hydraulic motor:	16.0 MPa (2320 lb/in²)
Hydraulic power at 90% of relief valve setting at 16.7 MPa (2422 lb/in²):	10.8 kW (14.5 hp)
Pump delivery rate at stated power:	38.7 l/min (8.5 gal/min)
Tapping point:	Auxiliary service connection
Temperature of hydraulic fluid:	62°C (143°F)

REPAIRS AND ADJUSTMENTS DURING TESTS: None

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: 22nd August 1984.