OECD Approval No. 873

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

Report on test of John Deere 4850 Tractor with Mechanical Front Wheel Drive



Manufactured by John Deere,
Tractor Works,
P.O. Box 3500, Waterloo,
IA 50704, USA

Test No. R83/70121/OECD

Report No. 693

Date February 1983

THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

National Institute of Agricultural Engineering
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Manufacturer's name and address:	John Deere, Tractor Works, P.O. Box 3500, Waterloo, IA 50704, USA
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running-in:	John Deere Product Engineering Centre
Duration of running-in:	73 hours

Tractor

Make:	John Deere
Model:	4850
Type:	4-wheel drive, unit construction
Serial No.:	RW4850P001212

Engine

Make:	John Deere
Model:	6466AR18
Type:	Diesel turbocharged
Serial No.:	RG6466 A231047
Cylinders:	
Number and disposition:	6 in-line, vertical
Bore:	115.9 mm (4.563 in)
Stroke:	120.6 mm (4.748 in)
Capacity:	7634 cm^3 (466 in^3)
Compression ratio:	15.8:1 nominal
Arrangement of valves:	Overhead
Liners:	Replaceable, wet
Fuel system:	
Feed system:	BOSCH fuel feed pump is incorporated in injection pump
Make, type and model of filter:	Stanadyne, dual replaceable element, model 22072
Tank capacity:	386 l (85 UK gal)
Make, type and model of injection pump:	Robert Bosch, in line, PES 6P 110A720RS3083
Injection pump Serial No.:	24608600
Manufacturer's production setting of injection pump:	138-146 mm^3 per stroke at 1100 rev/min pump speed, bench test figures, using fuel of 0.824 specific gravity at 15.6°C (60°F) and pump inlet temperature of 40°C (104°F)

Fuel system (Cont'd)	
Make, type and model of injectors:	Robert Bosch, KDEL 65 S1/13, 4 hole
Injection pressure:	29.0-29.6 MPa (286-292 atm)
Injection pump delivery starts:	26° before T.D.C.
Governor:	
Make and type:	Robert Bosch, US-RSV400-1100 A2B 2 mechanical
Governed range of engine speed:	800 rev/min to 2400 rev/min
Rated engine speed:	2200 rev/min
Air cleaner:	
Make and type:	Donaldson air maze, dry type with safety element
Model:	FTG11-0018 3 stage
Oil capacity:	None
Position:	Under the hood, on right-hand side of engine
Pre-cleaner:	
Make and type:	Donaldson with plastic mesh chaff screen
Position:	Top of air cleaner
Turbocharger:	
Make and type:	Air Research, T04B-87, exhaust driven
Lubrication system:	
Type of feed and pump:	Full pressure positive displacement
Type of filter:	Bypass and full flow primary
Total oil capacity including filter:	19.9 l (35.0 UK pt)
Recommended oil:	S.A.E. 15W40, viscosity 65 cSt at 50°C (122°F)
M.I.L. standard:	L2104C
Oil change period:	200 hours
Filter change period:	200 hours
Cooling system:	
Coolant:	Water and anti-freeze, 50% solution
Type of pump:	Centrifugal
Fan diameter:	696 mm (27.4 in)
Number of fan blades:	8
Type of temperature control:	2 thermostats and variable speed fan drive
Coolant capacity:	30.3 l (53.3 UK pt)
System pressure:	48 kPa (7 lb/in^2)
Starting system:	
Make, type and model:	Nippondenso electric motor, 028000-3291
Starter motor power rating:	4.0 kW (5.4 hp)
Safety features:	Electrical lockout on gearshift
Cold starting aid:	Ether spray in intake manifold

Exhaust system

Make and construction:	Donaldson MOM08-0
Dimensions of expansion chamber:	156 mm (6.1 in) x 257 mm (10.1 in) x 762 mm (30.0 in) long
Position:	Left-side over engine, outlet 3.31 m above ground

Electrical system

Voltage:	12
Earth polarity:	Negative
Make and type of alternator:	Nippondenso, 100211-0290
Output:	90 A at 2200 rev/min
Make and type of battery:	John Deere, lead-acid, dual 6-volt
Rating:	178 Ah at 100 hour rating

Transmission

Clutch:	
Make and type:	John Deere, multi-plate, oil cooled
Diameter of plates:	278 mm (10.9 in)
Method of operation:	Hydraulic, by foot pedal
Gearbox:	
Make and type:	John Deere, power shift transmission
Number of speeds:	15 forward and 4 reverse
Arrangement:	2 speed hydraulic shifted planetary in front of compound planetary with multiple wet disc clutches and brakes, shifting on the move, under load
Rear axle and final drive:	
Make and type:	John Deere, crown wheel and pinion, differential and planetary reduction
Type of differential lock and method of engagement:	Hydraulic, self disengaging
Front axle and final drive:	
Make and type:	ZF, crown wheel and pinion differential and planetary reduction
Driven from:	Rear of gearbox
Type of differential lock and method of engagement:	Limited slip, self locking

Transmission oils

	Gearbox and transmission housing	Front axle	Front wheel hubs
Recommended oil: John Deere	JDM J20A	JDM J11E	JDM J11E
Capacity:	98.0 l (172.5 UK pt)	9.0 l (15.8 UK pt)	4.5 l each (7.9 UK pt)
Viscosity at 50°C (122°F)	38 cSt	250 cSt	250 cSt
M.I.L. standard	-	L-2105C	L-2105C
Oil change period	1200 hours	1200 hours	1200 hours
Filter change period	600 hours	N.A.	N.A.

Gear	Number of engine revolutions for one revolution of driving wheel	Nominal travelling speed for 2200 rev/min rated engine speed,* km/h	(mile/h)
Forward			
1	332.8	2.13	(1.32)
2	232.6	3.05	(1.90)
3	192.5	3.68	(2.29)
4	153.2	4.63	(2.88)
5	133.0	5.33	(3.31)
6	117.2	6.05	(3.76)
7	101.7	6.97	(4.33)
8	88.5	8.01	(4.98)
9	76.8	9.23	(5.74)
10	67.7	10.47	(6.51)
11	58.8	12.06	(7.49)
12	52.5	13.51	(8.40)
13	42.5	16.69	(10.37)
14	30.4	23.33	(14.50)
15	24.5	28.94	(17.98)
Reverse			
1	240.5	2.95	(1.83)
2	168.0	4.22	(2.62)
3	110.7	6.41	(3.98)
4	73.5	9.65	(6.00)

*Calculated with a tyre radius index of 855 mm (33.7 in)

Power take-off

Position:	At rear of tractor in vertical centre plane
Height above ground:	678 mm (26.7 in)
Distance behind rear axle:	559 mm (22.0 in)
Diameter:	45 mm (1.77 in)
No. of splines:	20 to I.S.O. 500

Proportional engine speed pto 1000 rev/min:

Method of engagement:	Hydraulically actuated multi-plate clutch selected by hand lever independent of main clutch
Diameter of clutch plates:	196 mm (7.7 in)
Speed at rated engine speed:	998 rev/min
Engine speed at standard pto speed 1000 rev/min:	2205 rev/min
Direction of rotation viewed facing driving end:	Clockwise

Power lift

Make and type of pump:	John Deere, radial piston, variable delivery, constant pressure
Nominal working pressure:	13.8 MPa (2000 lb/in^2)
Pump drive:	From front of engine crankshaft
Oil supplied from:	Transmission housing via charge pump
Oil capacity:	98.0 l (172.5 UK pt), common with transmission
Oil capacity available for external use:	6.0 l (10.6 UK pt)
Permissible additional fill for external use:	7.0 l (12.3 UK pt)
Number of rams:	One internal, two external
Type, number and position of external tappings:	Three at rear of tractor, controls in cab with separate levers
Linkage category:	3 (2) and 3 narrow, to ISO 730/1 and ASAE S349, ? for dimensions see pages 17 and 18
Controls:	Draught or position control with intermediate steps, lower link sensing, adjustable speed on drop

Drawbar

Type:	Swinging
Vertical height to centre of clevis:	max. 576 mm (22.7 in), min. 464 mm (18.3 in)
Changed by:	Inverting drawbar and repositioning clevis
Distance behind rear axle centre:	1067 mm (42.0 in) and 997 mm (39.3 in)
Distance behind pto:	508 mm (20.0 in) and 438 mm (17.2 in)
Lateral adjustment:	390 mm (15.4 in) and 375 mm (14.8 in)
Pivot position relative to rear axle:	511 mm (20.1 in) forward
Drawbar pin hole diameter:	37 mm (1.5 in)

Hitch

Make and type:	None

Steering

Make and type:	John Deere, hydraulic, incorporating manual control for emergency
Make and type of pump:	John Deere, main hydraulic pump
Oil supplied from:	Transmission

Brakes

Make and type:	John Deere, oil immersed disc
Position:	On rear axle differential shafts
Method of operation:	Hydraulically actuated from main system operated by two pedals, independently or combined
Type of parking brake:	Transmission lock
Method of operation:	Gear selection lever
Emergency brake:	Oil supplied from accumulator through hand lever actuated valve, to multi plate transmission brake

Wheels

Steering wheels:

Make and size of tyres:	BF Goodrich Power Grip 16.9-28
Type:	Radial-ply 10-ply rating
Maximum mass on each tyre and pressure:	2380 kg (5247 lb) at 200 kPa (29 lb/in^2)
Track width:	1530 mm (60.2 in) by 8 steps to 2190 mm (86.2 in)
Changed by:	Reversing wheels and off-set lug rims

Driving wheels:

Make and size of tyres:	BF Goodrich Power Saver 20.8-38
Type:	Radial-ply 10-ply rating
Maximum mass on each tyre and pressure:	3475 kg (7661 lb) at 160 kPa (23 lb/in^2)
Track width:	1600 mm (63.0 in) by infinite steps to 2980 mm (117.3 in)
Changed by:	Rack and pinion axle, reversing wheels and off-set lug rims

Wheelbase: 2974 mm (117.1 in)

Cab

Description: John Deere Sound-Gard Cab has an integral four-post protective structure attached to the tractor through four anti-vibration mounts. Fitted with a door and mounting steps on the left side, air conditioning system and noise reduction padding on the inside

Lighting

Unrestricted beam angle of headlight in plan view 120°

	Height above ground of centre, mm	(in)	Size, mm	(in)	Distance from outside edge of tractor at 1600 mm (63.0 in) wheel track, to centre, mm	(in)
Headlights	1133	(44.6)	130 (5.1) dia		1157	(45.6)
Side lights	1554	(61.2)	70 (2.8) x 20 (0.8)		334	(13.1)
Rear lights	1781	(70.1)	70 (2.8) x 30 (1.2)		382	(15.0)
Reflectors						
Upper	1780	(70.1)	76 (3.0) dia		248	(9.8)
Lower	742	(29.2)	76 (3.0) dia		1124	(44.3)

Number of grease points

Whole tractor: 26

Overall dimensions

	Length, m	(in)	Width, max. m	(in)	Width, min. m	(in)	Maximum height to top of exhaust, m	(in)
Without ballast	5.05	(119)	3.51	(138)	2.74	(108)	3.31	(130)
With ballast	5.42	(213)	3.51	(138)	2.74	(108)	3.31	(130)

Minimum ground clearance 345 mm (13.6 in) to underside of drawbar frame

Seat

Make and type: John Deere Hydra Cushioned

Suspension and damping: By gas charged accumulators as spring. Power from main hydraulic system.

Range of adjustment: Longitudinal 150 mm (5.9 in)
Vertical 64 mm (2.5 in)

CONDITIONS DURING TEST

Masses

Tractor (without driver but with tanks full)

	Front, kg (lb)	Rear, kg (lb)	Total, kg (lb)
Without ballast	2908 (6411)	5180 (11420)	8088 (17831)
With ballast	4042 (8911)	5761 (12701)	9803 (21612)

Ballast

	Number of weights	Total mass, kg (lb)	Water, kg (lb)
Front wheels	Nil	Nil	Nil
Rear wheels (dual)	Nil	846 (1865)	Nil
Additional	Front frame plus 16 weights	869 (1916)	-

Track setting during tests

Front - 2015 mm (79.3 in)

Rear - 1800 mm (70.9 in)

FUEL AND LUBRICANTS USED IN TESTS

Fuel

Laboratory tests: Pto: Diesel oil to S.A.E. J313 Grade 2-d, specific gravity 0.8285 at 15°C (59°F), viscosity 2.25 cSt at 40°C (104°F), Cetane No. 50

Engine: Diesel oil to S.A.E. J313 Grade 2-d, specific gravity 0.8265 at 15°C (59°F), viscosity 2.21 cSt at 40°C (104°F), Cetane No. 50

Drawbar tests: Diesel oil to S.A.E. J313 Grade 2-d, specific gravity 0.829 at 15°C (59°F), viscosity 2.25 cSt at 40°C (104°F), Cetane No. 50

Oil

Engine: John Deere, Torq-Gard Supreme, S.A.E. 15W40, viscosity 65 cSt at 50°C (122°F)

Transmission and power lift: John Deere, Hy-Gard, viscosity 38 cSt at 50°C (122°F)

Front axle and front hubs: John Deere, J11E, S.A.E. 85W/140 multi-purpose, viscosity 250 cSt at 50°C (122°F)

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 22nd October 1982, John Deere, Tractor Works, USA

Type of dynamometer: Eaton, Dynamatic

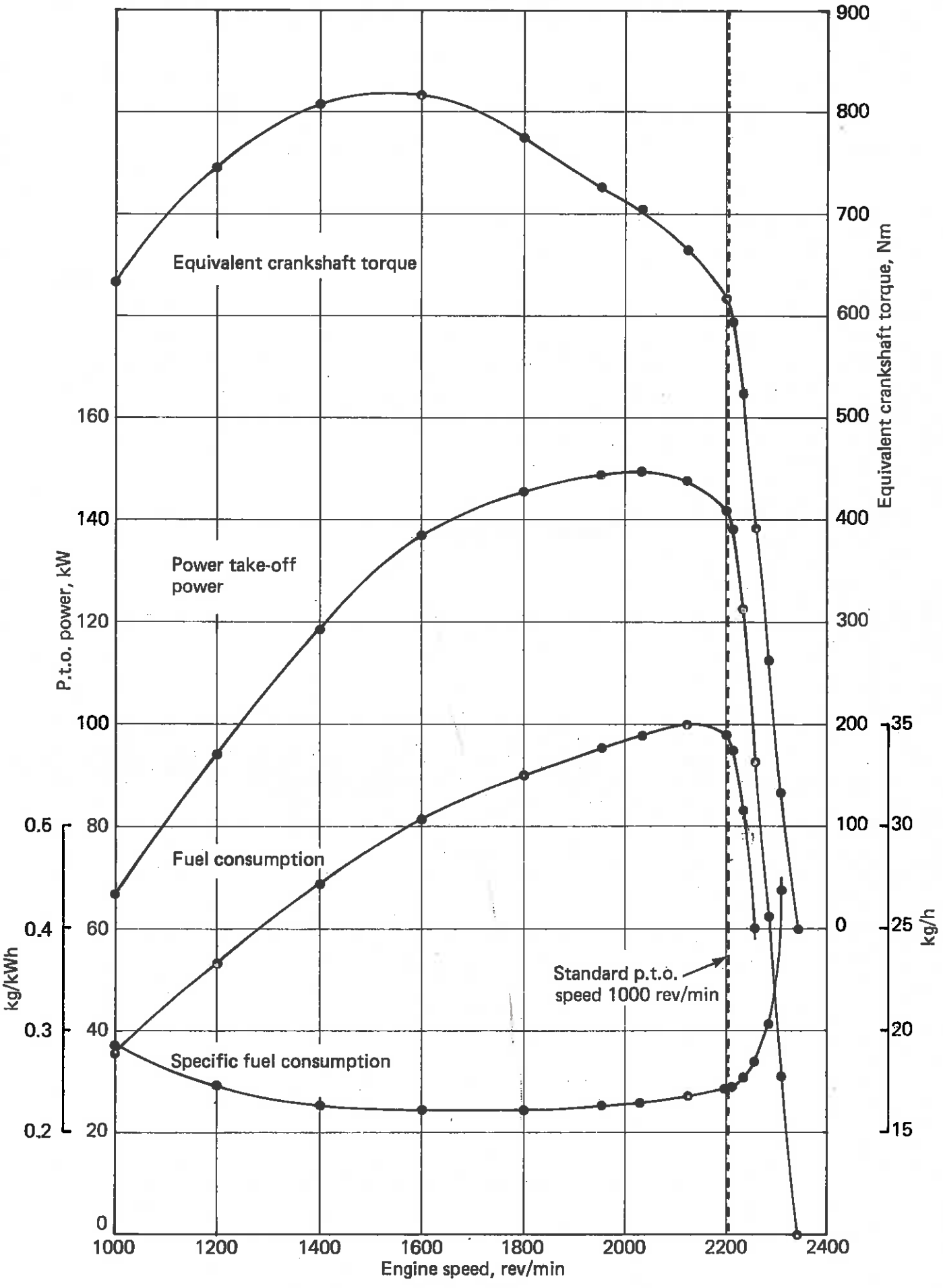
Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly, l/h (UKgal/h)	kg/h (lb/h)	Specific, kg/kWh (lb/hph)	Spec. engery, kWh/l (hph/UKgal)
	Engine	P.t.o.				
Maximum power - 2 hour test						
149.8 (200.9)	2030	921	41.66 (9.17)	34.52 (76.10)	0.230 (0.378)	3.60 (21.9)
The speed recommended by the manufacturer for drawbar work						
142.0 (190.4)	2200	998	41.65 (9.16)	34.51 (76.08)	0.243 (0.400)	3.41 (20.8)
Part loads						
(1) 85% of the torque obtained at rated speed						
122.4 (164.1)	2231	1012	37.24 (8.19)	30.85 (68.01)	0.252 (0.415)	3.29 (20.1)
(2) Unloaded						
0	2340	1061	9.90 (2.18)	8.20 (18.08)	-	-
(3) 50% of the torque defined in (1)						
62.6 (83.9)	2282	1035	23.32 (5.13)	19.32 (42.59)	0.309 (0.508)	2.68 (16.3)
(4) Maximum power at rated speed						
142.0 (190.4)	2200	998	41.65 (9.16)	34.51 (76.08)	0.243 (0.400)	3.41 (20.8)
(5) 25% of the torque defined in (1)						
31.7 (42.5)	2306	1046	16.85 (3.71)	13.96 (30.78)	0.440 (0.724)	1.88 (11.5)
(6) 75% of the torque defined in (1)						
92.8 (124.4)	2255	1023	30.25 (6.66)	25.06 (55.25)	0.270 (0.444)	3.07 (18.7)

Power, kW (hp)	Speed, rev/min		Fuel consumption Hourly,		Specific,	Spec. energy,
	Engine	P.t.o.	l/h (UKgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	kWh/l (hph/UKgal)
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (1000 rev/min)						
(1) 85% of the torque obtained at rated speed						
122.4 (164.1)	2231	1012	37.24 (8.19)	30.85 (68.01)	0.252 (0.415)	3.29 (20.1)
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0	2340	1061	9.90 (2.18)	8.20 (18.08)	-	-
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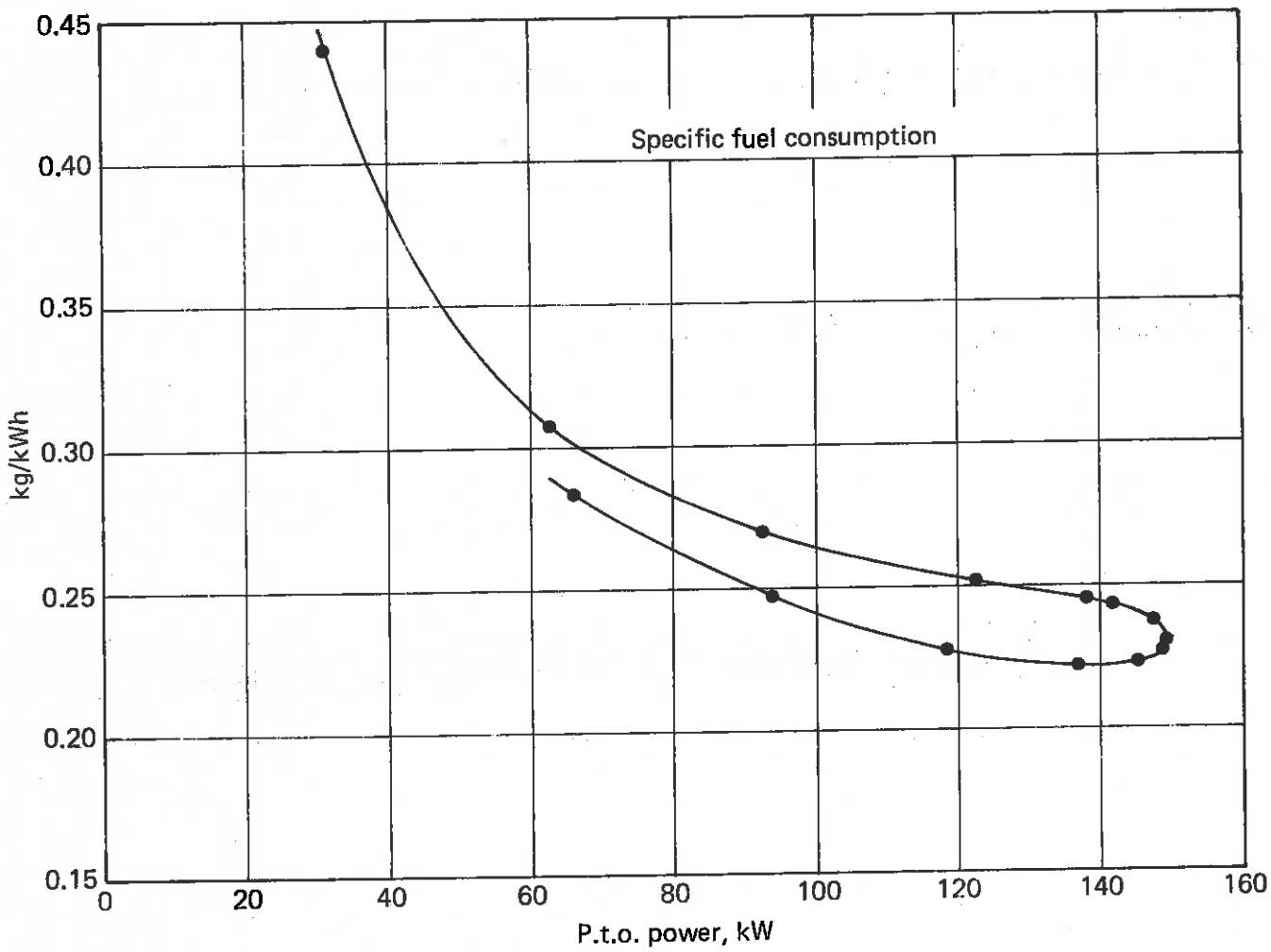
Standard specific fuel consumption, kg/kWh (lb/hph)

(a) 0.252 (0.415) (b) 0.309 (0.508) (c) 0.252 (0.415) (d) 0.309 (0.508)

No load, maximum engine speed		2340 rev/min
Equivalent crankshaft torque at maximum power		704.7 Nm (519.8 lb ft)
Maximum equivalent crankshaft torque		820.0 Nm (604.8 lb ft) at 1540 rev/min engine speed
Mean atmospheric conditions	temperature	17°C (63°F)
	pressure	1000 m bar (29.53 in Hg)
	relative humidity	39%
Maximum temperature	coolant	88°C (190°F)
	engine oil	96°C (205°F)
	fuel	45°C (113°F)
	air intake	26°C (79°F)



Power take-off test



Power take-off test

2 DRAWBAR PERFORMANCE

Date of tests: October 1982
Type of track: Concrete

Height of drawbar above ground: Unballasted: 400 mm (15.7 in)
Ballasted: 440 mm (17.3 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 110 kPa (16 lb/in^2), rear 110 kPa (16 lb/in^2)													
4	4.33 (2.69)	96.0 (128.7)	79.9 (17960)	2252	10.5	-	-	45 (113)	81 (178)	85 (185)	2 (36)	70	987 (29.15)
5	4.96 (3.08)	110.4 (148.0)	80.1 (18010)	2230	11.1	-	-	45 (113)	81 (178)	84 (183)	2 (36)	70	987 (29.15)
6	5.45 (3.39)	120.7 (161.9)	79.7 (17920)	2160	10.5	-	-	42 (108)	85 (185)	85 (185)	2 (36)	70	987 (29.15)
7	6.09 (3.78)	126.1 (169.1)	74.6 (16770)	2031	7.6	-	-	42 (108)	86 (187)	84 (183)	2 (36)	70	987 (29.15)
8	7.18 (4.46)	126.0 (169.0)	63.1 (14190)	2032	5.1	-	-	42 (108)	83 (181)	81 (178)	2 (36)	70	987 (29.15)
9	8.41 (5.23)	124.8 (167.4)	53.4 (12000)	2041	3.7	-	-	44 (111)	84 (183)	84 (183)	2 (36)	70	987 (29.15)
10	9.59 (5.96)	125.6 (168.4)	47.2 (10610)	2031	3.2	-	-	43 (109)	85 (185)	87 (189)	0 (32)	85	987 (29.15)
11	11.10 (6.90)	124.9 (167.5)	40.5 (9100)	2030	2.6	-	-	45 (113)	84 (183)	88 (190)	2 (36)	70	987 (29.15)
12	12.46 (7.74)	128.1 (171.8)	37.0 (8320)	2032	2.3	-	-	45 (113)	86 (187)	82 (180)	2 (36)	70	987 (29.15)
13	15.46 (9.61)	124.5 (167.0)	29.0 (6520)	2029	1.6	-	-	43 (109)	85 (185)	87 (189)	2 (36)	70	987 (29.15)
(ii) MAXIMUM POWER (ballasted) Tyre inflation pressure: front 150 kPa (22 lb/in^2), rear 80 kPa (12 lb/in^2)													
1	2.03 (1.26)	53.4 (71.6)	94.6 (21270)	2280	11.0	0.377 (0.620)	2.20 (13.4)	48 (118)	80 (176)	88 (190)	10 (50)	66	980 (28.94)
2	2.84 (1.76)	75.0 (100.6)	95.0 (21360)	2257	11.5	0.336 (0.553)	2.47 (15.1)	46 (115)	84 (183)	90 (194)	10 (50)	66	980 (28.94)
3	3.45 (2.14)	90.3 (121.1)	94.4 (21220)	2239	10.9	0.327 (0.538)	2.54 (15.5)	45 (113)	86 (187)	91 (196)	9 (48)	64	980 (28.94)
4	4.33 (2.69)	113.2 (151.8)	94.2 (21180)	2213	10.7	0.304 (0.500)	2.73 (16.6)	47 (117)	85 (185)	94 (201)	12 (54)	57	980 (28.94)
5	4.93 (3.06)	121.3 (162.7)	88.6 (19920)	2132	7.2	0.290 (0.477)	2.86 (17.4)	46 (115)	89 (192)	93 (199)	12 (54)	57	980 (28.94)
6	5.37 (3.34)	126.8 (170.0)	85.0 (19110)	2024	6.5	0.274 (0.451)	3.03 (18.5)	44 (111)	89 (192)	92 (198)	12 (54)	57	980 (28.94)
7	6.32 (3.93)	128.5 (172.3)	73.2 (16460)	2031	4.5	0.272 (0.447)	3.05 (18.6)	44 (111)	88 (190)	90 (194)	13 (55)	59	980 (28.94)
8	7.34 (4.56)	126.1 (169.1)	61.8 (13890)	2027	3.4	0.278 (0.457)	2.98 (18.2)	44 (111)	89 (192)	91 (196)	14 (57)	50	980 (28.94)
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
7	7.05 (4.38)	107.5 (144.2)	54.9 (12340)	2229	3.0	0.300 (0.494)	2.76 (16.8)	44 (111)	86 (187)	93 (199)	10 (50)	76	980 (28.94)
(iv) + FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
3	3.58 (2.22)	-	96.2 (21630)	2237	-	-	-	44 (111)	85 (185)	93 (199)	11 (52)	56	981 (28.97)

Total oil consumption during ten hours duration of tests (iii) and (iv) 14.0 g/h (0.031 lb/h)

+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 - 2015 mm (79.3 in)
rear - 2002 mm (78.8 in)

	With brakes		Without brakes	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)	4.72 (186)	4.67 (184)	6.39 (252)	6.40 (252)
Radius of turning circle, m (in)	4.46 (176)	4.41 (174)	6.13 (241)	6.14 (242)

4. LOCATION OF CENTRE OF GRAVITY

Height above ground, mm (in)	1048 (41.3)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	1063 (41.9)
Distance from the median plane of the tractor, mm (in)	0

5. BRAKING (Front wheel drive disengaged)

Date of tests: 8th and 16th November 1982

Type of track: Concrete

Masses during brake tests

	Front, kg	(lb)	Rear, kg	(lb)	Total, kg	(lb)
Ballasted	3992	(8801)	6985	(15399)	10977	(24200)
Unballasted	2908	(6411)	5180	(11420)	8088	(17831)

Tyres

Front: 16.9-28, 10-ply rating

Rear: 20.8-38, 10-ply rating

Type 0 Service brakes (cold)

Travelling speed before application of brakes, 31.9 km/h (19.8 mile/h)

Ballasted	Force on brake pedal	N (lb)	150 (34)	200 (45)	250 (56)	300 (67)	350 (79)	400 (90)	435 (98)
	Mean deceleration	m/s^2 (ft/s^2)	0.8 (2.6)	1.3 (4.3)	1.9 (6.2)	2.4 (7.9)	2.9 (9.5)	3.5 (11.5)	3.9 (12.8)
Unballasted	Force on brake pedal	N (lb)	150 (34)	200 (45)	250 (56)	300 (67)	355 (80)		
	Mean deceleration	m/s^2 (ft/s^2)	1.0 (3.3)	1.7 (5.6)	2.4 (7.9)	3.1 (10.2)	3.9 (12.8)		

Type 1 Service brakes (hot)

Ballasted	Force on brake pedal	N (lb)	150 (34)	200 (45)	250 (56)	300 (67)	350 (79)	400 (90)	415 (93)
	Mean deceleration	m/s^2 (ft/s^2)	0.9 (3.0)	1.5 (4.9)	2.0 (6.6)	2.6 (8.5)	3.2 (10.5)	3.7 (12.1)	3.9 (12.8)

Brakes were heated by: Towing

Comments on deviation and vibration: None

Parking brake Transmission lock, engaged by gear selector lever

6. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests:	3rd and 4th November 1982
Type of sound level meter:	Bruel and Kjaer 2204
Type of track:	Concrete
Results of tests:	
Gear:	15
Travelling speed before acceleration:	23.9 km/h (14.9 mile/h)
Sound level:	90 dBA

7. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 3rd November 1982
Type of sound level meter: Bruel and Kjaer 2204
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			
*8	55.0 (12360)	7.9 (4.9)	80
*8	Light load	8.7 (5.4)	75
15	Light load	31.9 (19.8)	77

*The 8th 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 of tests: 25th October 1982

Hydraulic fluid:

Make and type: John Deere Hy-Gard
Viscosity: 38 cSt at 50°C (122°F)

Type of linkage lock for transport: Hydraulic

Power lift

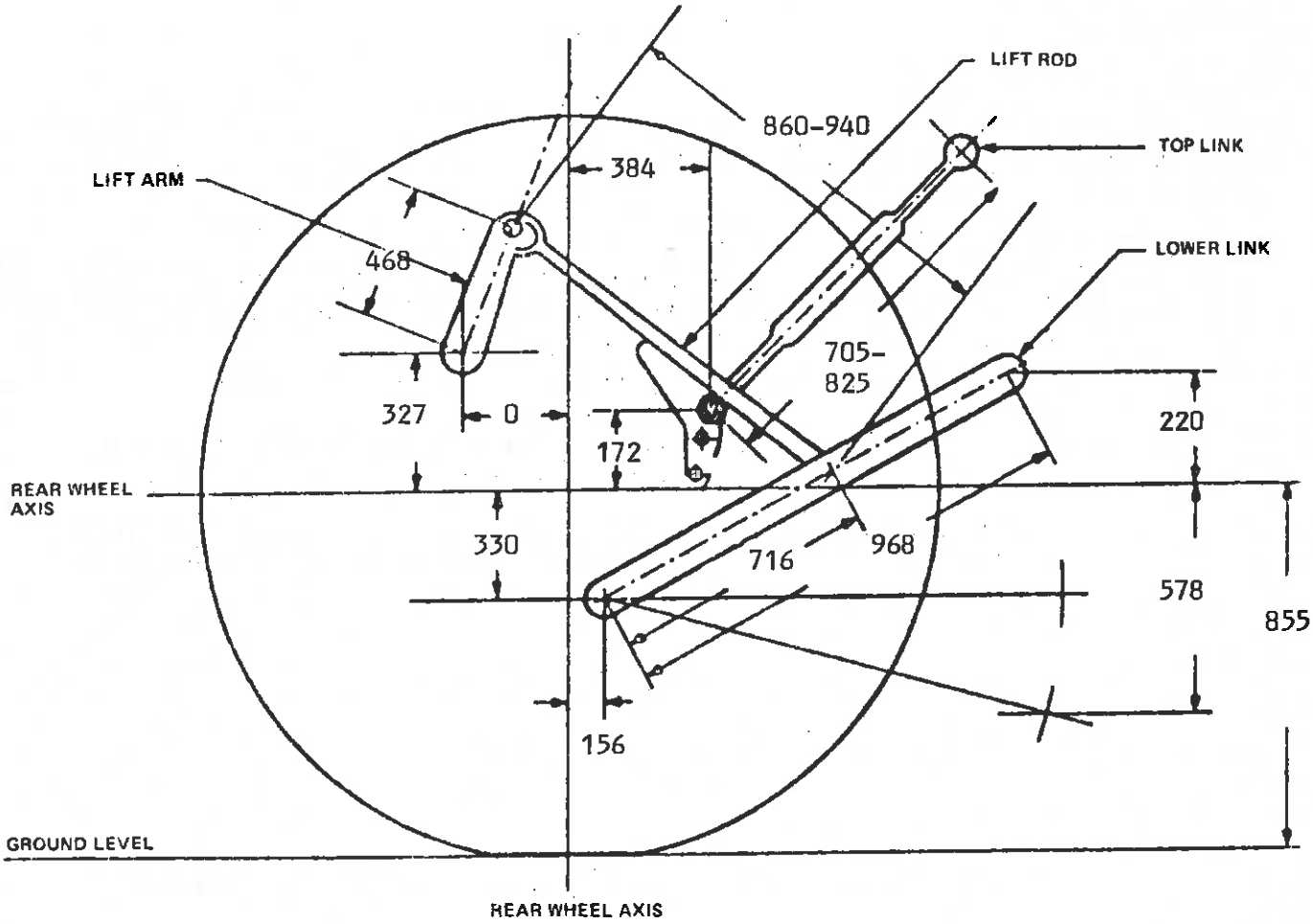
	Height of lower hitch point above ground in down position, mm (in)	Vertical movement, mm (in)	Maximum force exerted through full range, kN (lb)	Corresponding pressure of hydraulic fluid, MPa (lb/in^2)	Moment about rear axle, kNm (lb ft)	Maximum tilt angle of mast over range of lift, degrees
At the hitch points	277 (10.9)	798 (31.4)	40.5 (9100)	14.1 (2040)	45.5 (33560)	-
On the frame	277 (10.9)	917 (36.1)	37.7 (8480)	14.1 (2040)	65.4 (48240)	12

Hydraulic pump performance

Opening pressure of the relief valve:	11.0 MPa (1600 lb/in^2)
Sustained pressure with relief valve open:	15.8 MPa (2290 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:	129.6 l/min (28.5 gal/min)
Pressure specified by the manufacturer for an external hydraulic motor:	11.0 MPa (1600 lb/in^2)
Hydraulic power at 11.0 MPa (1600 lb/in^2):	23.3 kW (31.2 hp)
Pump delivery rate at stated power:	127.2 l/min (28.0 gal/min)
Tapping point:	3 at rear of tractor, 2 used for test
Temperature of hydraulic fluid:	68°C (154°F)

Power lift

Dimensions of linkage geometry, mm (lift rod length 900 mm)



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

Projected length in side view	
Lower links	968 (38.1)
Lift arms	468 (18.4)
Lift rods	897 (35.3)
Top link	742 (29.2)
Distance of lift rod connection point from pivot point of lower link	716 (28.2)
The following dimensions are given relative to the rear wheel centre line, situated 855 mm (33.7 in) above the ground level	
Lower link pivot point	156 (6.1) behind, 330 (13.0) below
Top link pivot point	384 (15.1) behind, 172 (6.8) above
Lift arm pivot point	On centreline 327 (12.9) above
Maximum and minimum height of lower link hitch points	220 (8.7) above, 578 (22.8) below
Height of lower link hitch points when locked in transport position	Any height within lift range

OPTIONAL TESTS

9. PERFORMANCE AT ENGINE CRANKSHAFT

Date and location of tests: 12th November 1982, John Deere, Tractor Works, USA

Type of dynamometer: Eaton Dynamatic

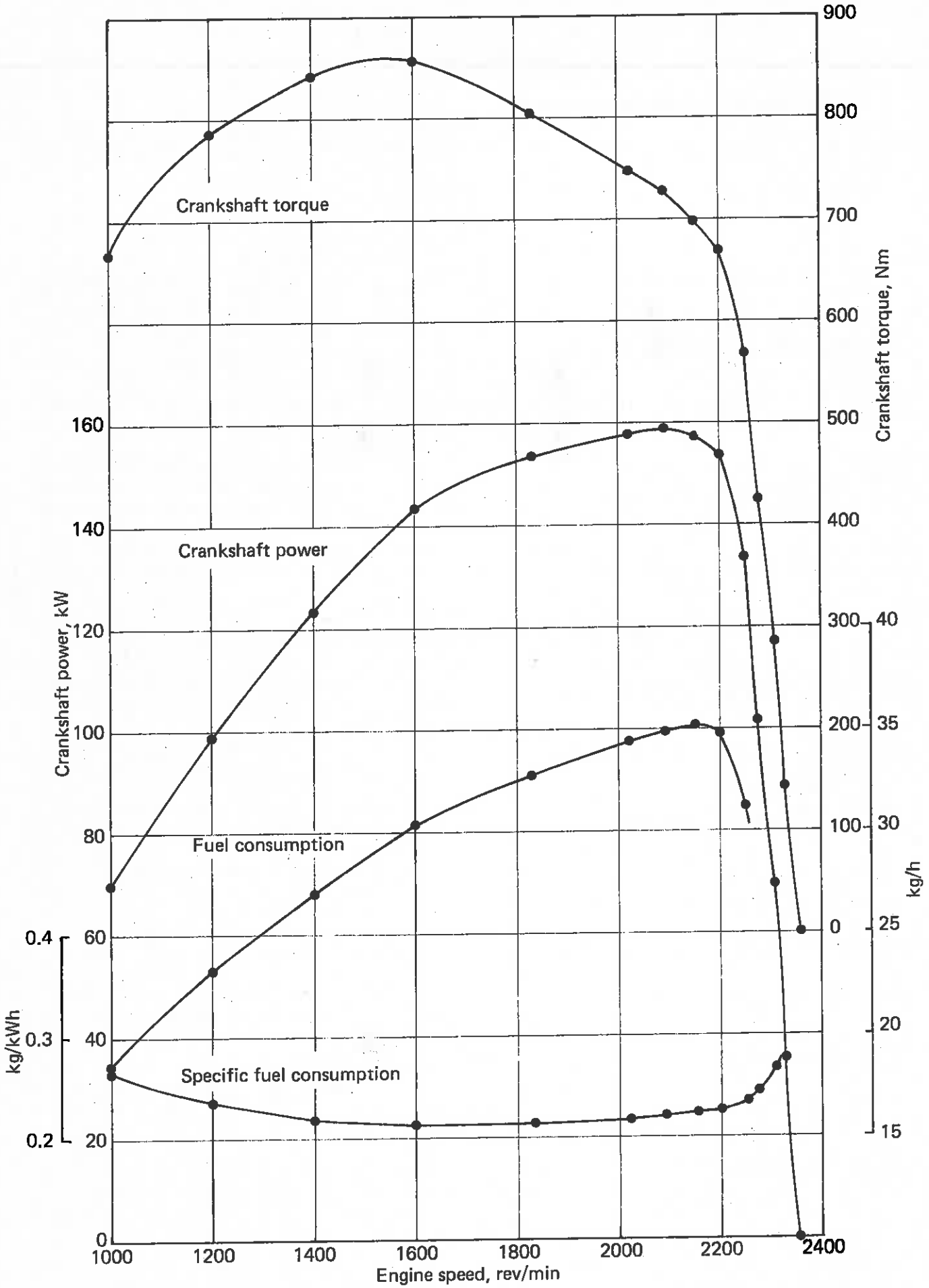
Power, kW (hp)	Speed, rev/min	Fuel consumption Hourly, l/h (UKgal/h)	Hourly, kg/h (lb/h)	Specific, kg/kWh (lb/hph)	Spec. energy, kWh/l (hph/UKgal)
Maximum power - 2 hour test					
158.4 (212.4)	2090	42.21 (9.29)	34.89 (76.92)	0.220 (0.362)	3.75 (22.9)
The speed recommended by the manufacturer for drawbar work					
153.9 (206.4)	2200	42.08 (9.26)	34.78 (76.68)	0.226 (0.372)	3.66 (22.3)
Part loads					
(1) 85% of the torque obtained at rated speed					
133.8 (179.4)	2250	37.53 (8.26)	31.02 (68.39)	0.232 (0.382)	3.57 (21.8)
(2) Unloaded					
-	2358	7.88 (1.73)	6.51 (14.35)	-	-
(3) 50% of the torque defined in (1)					
68.6 (92.0)	2307	22.35 (4.92)	18.47 (40.72)	0.269 (0.443)	3.11 (19.0)
(4) Maximum power at rated speed					
153.9 (206.4)	2200	42.08 (9.26)	34.78 (76.68)	0.226 (0.372)	3.66 (22.3)
(5) 25% of the torque defined in (1)					
34.6 (46.4)	2326	15.03 (3.31)	12.42 (27.38)	0.359 (0.591)	2.30 (14.0)
(6) 75% of the torque defined in (1)					
101.6 (136.2)	2277	29.85 (6.57)	24.67 (54.39)	0.243 (0.400)	3.40 (20.7)

No load, maximum engine speed 2358 rev/min

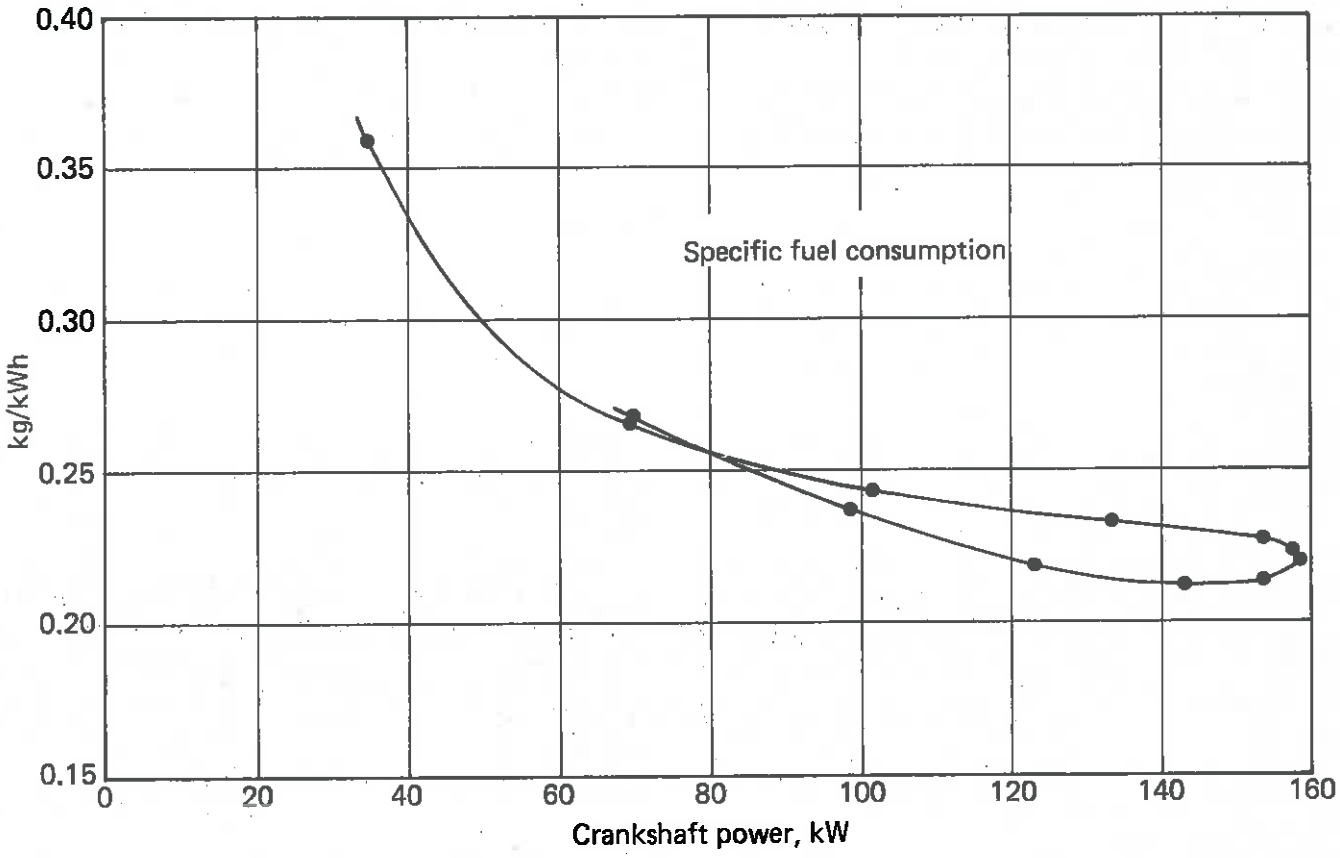
Crankshaft torque at maximum power 723.8 Nm (533.8 lb ft)

Maximum crankshaft torque 859.0 Nm (633.6 lb ft) at 1540 rev/min engine speed

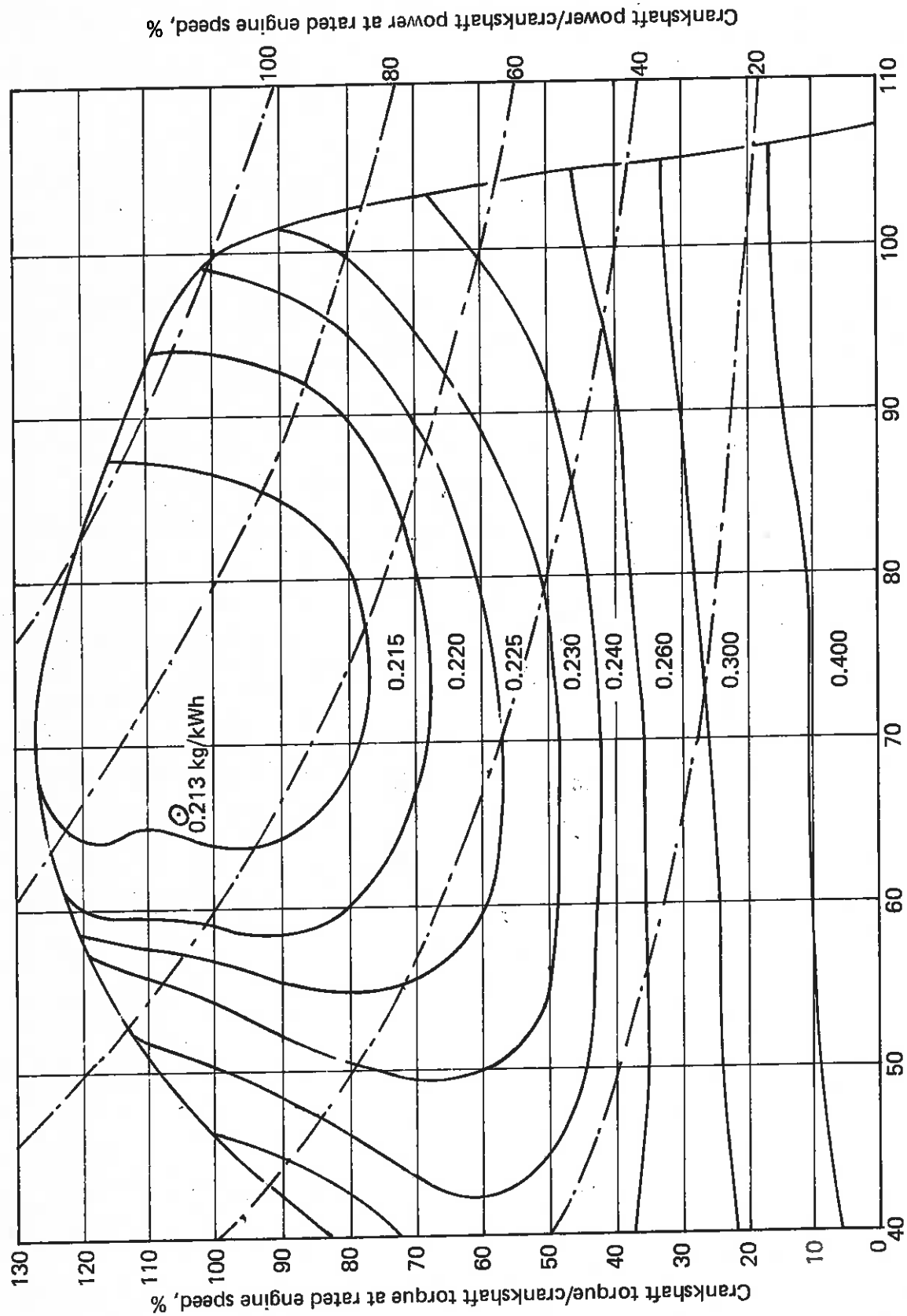
Mean atmospheric conditions	temperature	16°C (61°F)
	pressure	979 m bar (28.90 in Hg)
	relative humidity	29%
Maximum temperature	coolant	87°C (189°F)
	engine oil	93°C (199°F)
	fuel	46°C (115°F)
	air intake	31°C (88°F)


Crankshaft torque
Crankshaft power
Fuel consumption
Specific fuel consumption
Crankshaft power, kW
Crankshaft torque, Nm
kg/h
kg/kWh
Engine speed, rev/min
0
20
40
60
80
100
120
140
160
200
300
400
500
600
700
800
900
100
200
0
0.2
0.3
0.4
15
20
25
30
35
40
1000
1200
1400
1600
1800
2000
2200
2400

Engine test


0.40
0.35
0.30
0.25
0.20
0.15
kg/kWh
Specific fuel consumption
0
20
40
60
80
100
120
140
160
Crankshaft power, kW

Engine test



Engine test, specific fuel consumption

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS:

Dual rear wheels are recommended by the manufacturer for field work where tyre carrying capacity allows added ballast to control wheel slip and were fitted during the 'Ballasted' tests. The tractor was fitted with single wheels for the 'Unballasted' tests.

Test carried out by: F. Thistlethwaite, J.P. Evans

Signed: D.W Smith Tractor Test Section

for the Director

Date: 10th February 1983