OECD Approval No. 859

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

Report on test of John Deere 8650 Tractor





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

Test No. R82/70053/OECD

Report No. 690

Date August 1982

THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

National Institute of Agricultural Engineering
Wrest Park Silsoe Bedford MK45 4HS

BSRAE Copyright

TABLE OF CONTENTS

		Page No.
SPECIFICATION OF TRACTOR		1
CONDITIONS DURING TEST		7
FUEL AND LUBRICANTS USED IN TESTS		7
COMPULSORY TESTS		
1	Main power take-off performance	8
2	Drawbar performance	12
3	Turning space and turning circle	13
4	Location of centre of gravity	13
5	Braking	13
6	Measurement of external noise level	14
7	Noise measurement at the driver's ear	15
8	Power lift and hydraulic pump performance	15
REPAIRS AND ADJUSTMENTS DURING TESTS		17
REMARKS		17

SPECIFICATION OF TRACTOR

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:	150 hours

Tractor

Make:	John Deere
Model:	8650
Type:	4-wheel drive, articulated
Serial No.:	RW8650H001584

Engine

Make:	John Deere
Model:	6619AR-12
Type:	Diesel, turbo-charged and intercooled
Serial No.:	044713RG
Cylinders:	
Number and disposition:	6 in-line, vertical
Bore:	130.2 mm (5.125 in)
Stroke:	127.0 mm (5.000 in)
Capacity:	10141 cm^3 (618.9 in^3)
Compression ratio:	14.7:1 (nominal)
Arrangement of valves:	Overhead
Liners:	Wet, replaceable
Fuel system:	
Feed system:	Feed pump integral with injection pump
Make, type and model of filter:	Dual Stanadyne, replaceable element, 22072
Tank capacity:	810 l (178.2 UK gal)
Make, type and model of injection pump:	Robert Bosch, PES6P 110A 720 RS 3086
Injection pump Serial No.:	241 00585
Manufacturer's production setting of injection pump:	210-218 mm^3 per stroke at 1050 rev/min pump speed, bench test figures using fuel of 0.828 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, multi-hole
Injection pressure:	26.2-27.0 MPa (258-266 atm)
Injection pump delivery starts:	28° before T.D.C.
Governor:	
Make and type:	Robert Bosch US-RSV400 PO/492
Governed range of engine speed:	800 rev/min to 2325 rev/min
Rated engine speed:	2100 rev/min
Air cleaner:	
Make and type:	Donaldson, dry with safety element
Model:	EGB12-0215
Oil capacity:	None
Position:	On right-hand side of safety cab, above fuel tank
Pre-cleaner:	
Make and type:	Donaldson PSH001464
Position:	Top of air cleaner
Turbo-charger:	
Make and type:	Air Research TV6102, exhaust driven Serial No. KL0659
Lubrication system:	
Type of feed and pump:	Full pressure positive displacement
Type of filter:	Bypass and full flow primary
Total oil capacity including filter:	26.5 l (46.6 UK pt)
Recommended oil:	S.A.E. 40, viscosity 110 cSt at 50°C (122°F)
M.I.L. standard:	L2104C
Oil change period:	200 hours
Filter change period:	200 hours
Cooling system:	
Coolant:	Liquid
Type of pump:	Centrifugal
Fan diameter:	628 mm (24.7 in)
Number of fan blades:	9, mixed flow
Type of temperature control:	3 thermostats
Coolant capacity:	45.4 l (79.9 UK pt)
System pressure:	103 kPa (15 lb/in^2)
Starting system:	
Make, type and model:	Delco, 40MT electric motor
Starter motor power rating:	4.9 kW (6.6 hp)
Safety features:	Electrical lock-out on gear shift
Cold starting aids:	In-block coolant heater and ether spray in intake manifold

Exhaust system

Make and construction:	Donaldson
Dimensions of expansion chamber:	234 mm (9.2 in) dia x 1102 mm (43.4 in) long
Position:	Right-hand side of cab

Electrical system

Voltage:	12
Earth polarity:	Negative
Make and type of generator:	Neihoff alternator, Model N1114
Output:	110 A at 2100 rev/min
Make and type of battery:	John Deere dual 6 volt
Rating:	208 Ah at 20 hour rating

Transmission

Clutch:	
Make and type:	John Deere, multi-plate, oil cooled
Diameter of plates:	305 mm (12.0 in)
Method of operation:	Hydraulic by foot pedal
Gearbox:	
Make and type:	John Deere Quad-range
Number of speeds:	16 forward and 6 reverse
Arrangement:	2-speed power shift on 8-speed box
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:	Front and rear, mechanical electro-hydraulic, self-disengaging
Front axle and final drive:	
Make and type:	John Deere crown wheel and pinion, differential and planetary reduction
Driven from:	Rear gear box

Transmission oils

	Gearbox, front and rear axles
Recommended oil:	John Deere Hy-Gard
Capacity:	169 l (297 UK pt)
Viscosity at 50°C (122°F)	38 cSt
M.I.L. standard	-
Oil change period	1200 hours
Filter change period	As required by warning system

Gear	Number of engine revolutions for one revolution of driving wheel	Nominal travelling speed for 2100 rev/min rated engine speed,* km/h	(mile/h)
Forward			
A1	188.67	3.59	(2.23)
A2	151.17	4.48	(2.78)
A3	104.40	6.48	(4.03)
B1	93.71	7.22	(4.49)
A4	83.64	8.09	(5.03)
B2	75.07	9.02	(5.61)
C1	71.46	9.47	(5.89)
C2	57.25	11.82	(7.35)
B3	51.83	13.06	(8.12)
D1	44.12	15.34	(9.53)
B4	41.55	16.29	(10.12)
C3	39.56	17.11	(10.63)
D2	35.34	19.15	(11.90)
C4	31.78	21.30	(13.24)
D3	24.40	27.74	(17.24)
D4	19.55	34.62	(21.52)
Reverse			
A1	96.49	7.02	(4.36)
A2	77.31	8.76	(5.44)
B1	47.93	14.12	(8.78)
B2	38.40	17.63	(10.96)
C1	36.54	18.52	(11.51)
C2	29.29	23.11	(14.36)

*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:	689 mm (27.1 in)
Distance behind rear axle:	559 mm (22.0 in)
Diameter:	44.45 mm (1.75 in)
Number of splines:	20 to I.S.O. 500
Proportional engine speed pto:	
Method of engagement:	By hydraulically actuated multi-plate clutch selected by hand lever independent of main clutch
Speed at rated engine speed:	993 rev/min
Engine speed at standard pto speed of 1000 rev/min:	2115 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:	15.5 MPa (2250 lb/in^2)
Pump drive:	From engine crankshaft
Oil supplied from:	Transmission via charge pump
Type, number and position of external tappings:	2 at rear of tractor - controls in cab with separate levers
Oil capacity:	169 l (37.2 UK gal)
Oil capacity available for external use:	6.0 l (1.3 UK gal)
Permissible additional fill for external use:	20.0 l (4.4 UK gal)
Linkage category:	3, to I.S.O. 730/1
Controls:	Lower link sensing, position/draught with intermediate steps, adjustable speed on drop

Drawbar

Type:	Swinging
Vertical height to centre of clevis:	max. 584 mm (23.0 in), min. 508 mm (20.0 in)
Changed by:	Inverting drawbar
Distance behind rear axle centre:	1054 mm (41.5 in)
Distance behind pto:	495 mm (19.5 in)
Lateral adjustment	406 mm (16.0 in)
Pivot position relative to rear axle:	393 mm (15.5 in) forward
Drawbar pin hole diameter:	38 mm (1.5 in)

Steering

Make and type:	John Deere full power, hydrostatic
Make and type of pump:	John Deere, variable delivery, constant pressure
Oil supplied from:	Transmission via charge pump or emergency steering system

Brakes

Make and type:	John Deere, oil-immersed disc
Position:	On rear axle differential shafts
Method of operation:	Hydraulically actuated from main system, foot pedal operated or lever operated from reservoir
Type of parking brake:	Transmission lock
Method of operation:	Gear selector lever

Wheels

Make and size:	B.F. Goodrich Powergrip 20.8-38
Type:	Cross-ply, 8 ply rating
Maximum mass on each tyre and pressure:	3090 kg (6812 lb) at 130 kPa (19.0 lb/in^2)
Track width:	1820 mm (71.7 in) to 3150 mm (124.0 in)
Changed by:	Rack and pinion on axle

Wheelbase 3180 mm (125.2 in)

Cab

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

Lighting

Unrestricted beam angle of headlight in plan view: Outer 100°
Inner 120°

	Height above ground of centre, mm	(in)	Size, mm	(in)	Distance from outside edge of tractor at 3148 mm (123.9 in) outer wheel track, to centre, mm	(in)
Headlights -						
Outer	1108	(43.6)	130	(5.1) dia	1087	(42.8)
Inner	1108	(43.6)	130	(5.1) dia	1270	(50.0)
Side lights	1128	(44.4)	70 20	(2.8) x (0.8)	537	(21.1)
Rear lights	1848	(72.8)	70 30	(2.8) x (1.2)	496	(19.5)
Reflectors -						
Outer	1764	(69.4)	76	(3.0) dia	451	(17.6)
Inner	1764	(69.4)	76	(3.0) dia	541	(21.3)

Number of grease points

Whole tractor: 29

Overall dimensions

	Length,		Width,				Maximum height to top of exhaust,	
			max.		min.			
	m	(in)	m	(in)	m	(in)	m	(in)
Single wheels	5.87	(231)	3.72	(146)	3.01	(119)	3.91	(154)
Dual wheels	5.87	(231)	3.72	(146)	3.62	(143)	3.91	(154)

Minimum ground clearance 340 mm (13.4 in) to underside of linkage restraints

Seat

Make and type: John Deere Hydra Cushioned

Suspension and damping: By gas spring hydraulic accumulator 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 and ballast but with tanks full)

	Front,		Rear,		Total,	
	kg	(lb)	kg	(lb)	kg	(lb)
Single wheels	6654	(14670)	5720	(12610)	12374	(27280)
Dual wheels	7416	(16349)	6455	(14231)	13871	(30580)

Track setting during tests

	Inner	Outer
Front:	1820 mm (71.7 in)	3148 mm (123.9 in)
Rear:	1820 mm (71.7 in)	3148 mm (123.9 in)

FUEL AND LUBRICANTS USED IN TESTS

Fuel

Diesel oil to S.A.E. J313 Grade 2-D, specific gravity for pto tests 0.8328 at 15°C (59°F), for drawbar tests 0.831 at 15°C (59°F), viscosity 2.0-4.0 cSt at 40°C (104°F), Cetane No. 48 min.

Oil

Engine: John Deere Torq-Gard Supreme, S.A.E. 15W-40 viscosity 110 cSt at 50°C (122°F)

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

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 30th June 1982, John Deere Works, USA

Type of dynamometer: Eaton, Water Brake

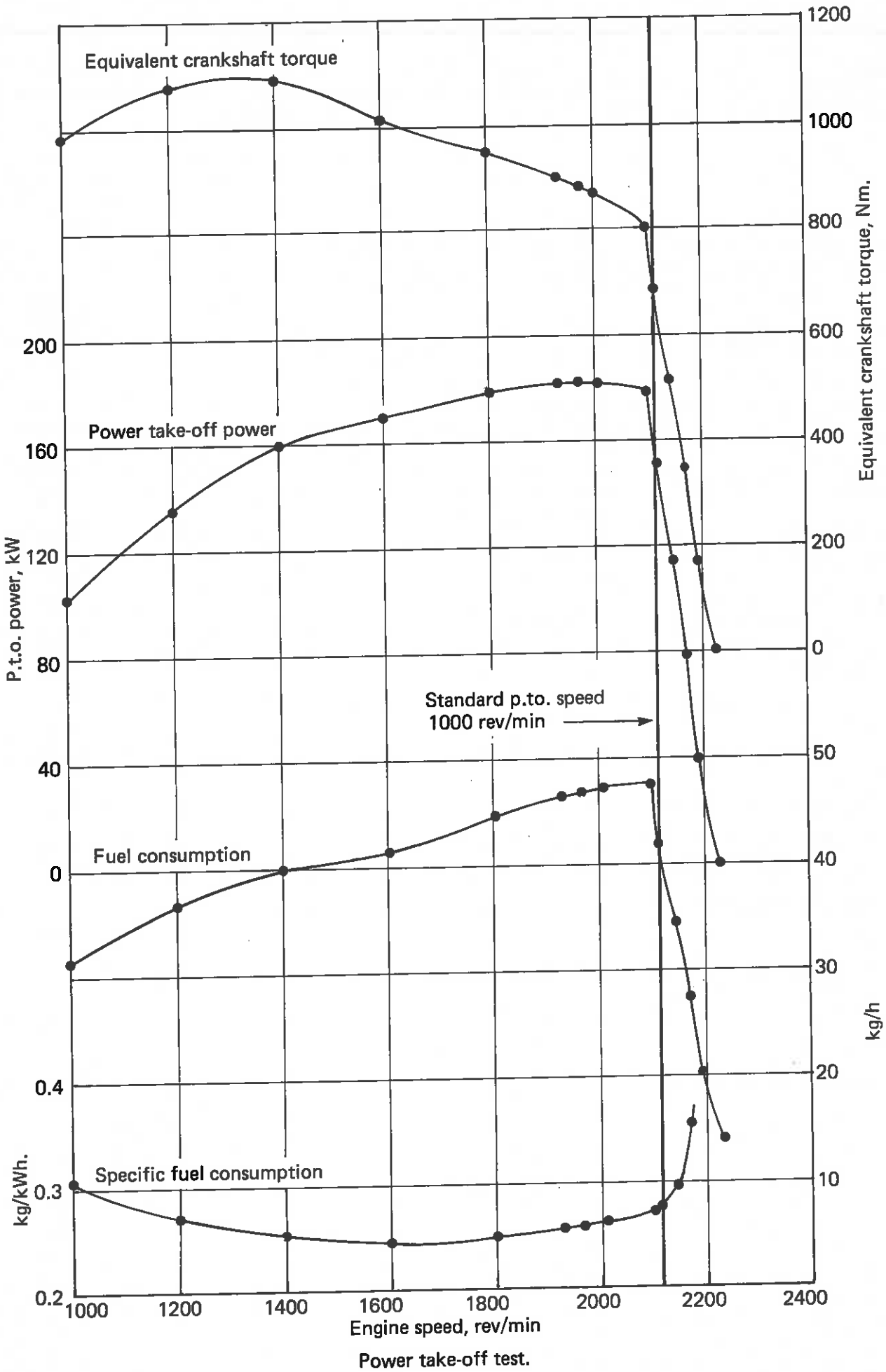
Power, kW (hp)	Speed, rev/min		Fuel consumption,			
	Engine	P.t.o.	l/h (UKgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	kWh/l (hph/UKgal)
Maximum power - 2 hour test						
181.2 (243.0)	1970	931	56.06 (12.33)	46.69 (102.93)	0.258 (0.424)	3.23 (19.7)
The speed recommended by the manufacturer for drawbar work						
177.5 (238.0)	2100	993	57.52 (12.65)	47.90 (105.60)	0.270 (0.444)	3.09 (18.8)
Part loads						
(1) 85% of the torque obtained at rated speed						
151.8 (203.6)	2113	999	50.30 (11.06)	41.89 (92.35)	0.276 (0.454)	3.02 (18.4)
(2) Unloaded						
0	2226	1052	16.93 (3.72)	14.10 (31.08)	-	-
(3) 50% of the torque defined in (1)						
77.8 (104.3)	2166	1024	32.95 (7.25)	27.44 (60.49)	0.353 (0.580)	2.36 (14.4)
(4) Maximum power						
177.5 (238.0)	2100	993	57.52 (12.65)	47.90 (105.60)	0.270 (0.444)	3.09 (18.8)
(5) 25% of the torque defined in (1)						
39.3 (52.7)	2192	1036	24.06 (5.29)	20.04 (44.18)	0.510 (0.838)	1.63 (9.9)
(6) 75% of the torque defined in (1)						
115.3 (154.6)	2141	1012	41.23 (9.07)	34.34 (75.71)	0.298 (0.490)	2.80 (17.1)

Power, kW (hp)	Speed, rev/min		Fuel consumption,			
	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 maximum power						
151.8 (203.6)	2113	999	50.30 (11.06)	41.89 (92.35)	0.276 (0.454)	3.02 (18.4)
(2) Unloaded						
0	2226	1052	16.93 (3.72)	14.10 (31.08)	-	-
(3) 50% of the torque defined in (1)						
77.8 (104.3)	2166	1024	32.95 (7.25)	27.44 (60.49)	0.353 (0.580)	2.36 (4.4)
(4) Maximum power						
177.5 (238.0)	2100	993	57.52 (12.65)	47.90 (105.60)	0.270 (0.444)	3.09 (18.8)
(5) 25% of the torque defined in (1)						
39.3 (52.7)	2192	1036	24.06 (5.29)	20.04 (44.18)	0.510 (0.838)	1.63 (9.9)
(6) 75% of the torque defined in (1)						
115.3 (154.6)	2141	1012	41.23 (9.07)	34.34 (75.71)	0.298 (0.490)	2.80 (17.1)

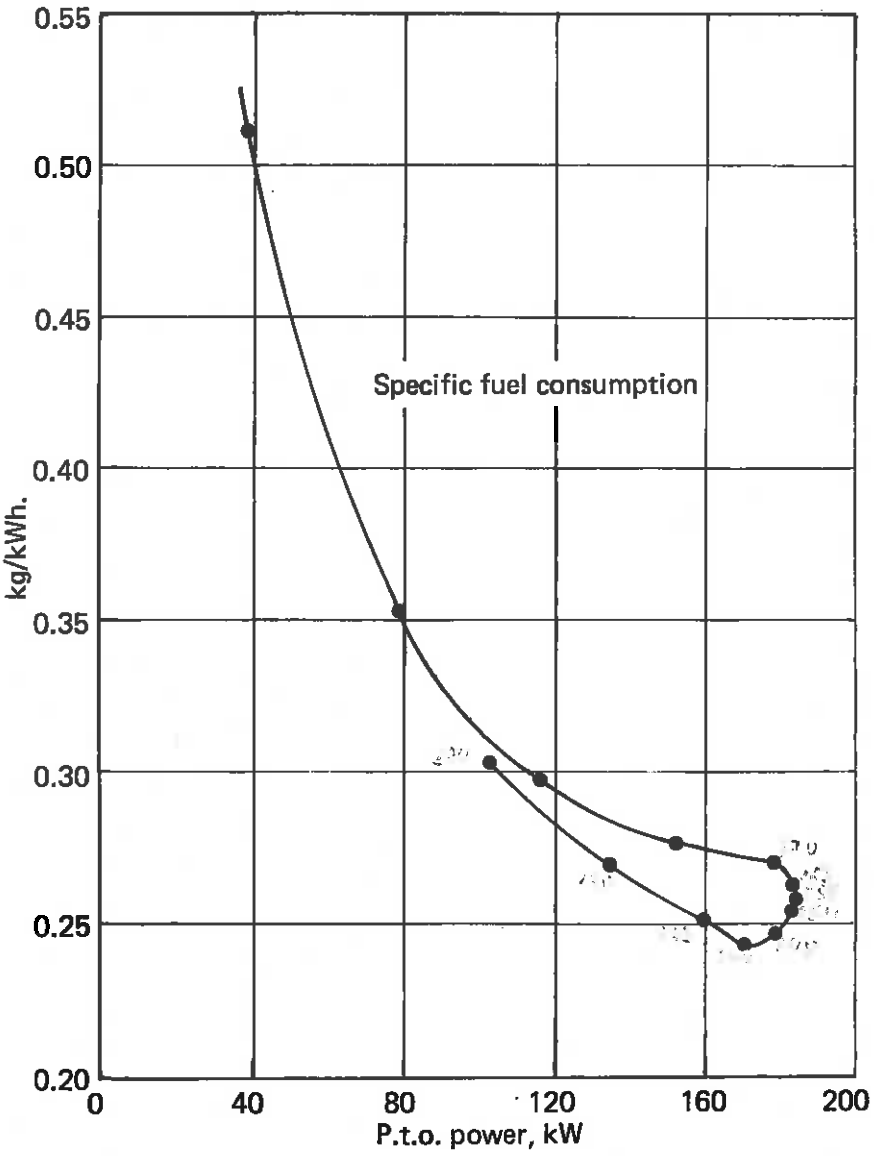
Standard specific fuel consumption, kg/kWh (lb/hph)

(a) 0.276 (0.454) (b) 0.353 (0.580) (c) 0.276 (0.454) (d) 0.353 (0.580)

No load, maximum engine speed		2226 rev/min
Equivalent crankshaft torque at maximum power		878 Nm (648 lb ft)
Equivalent crankshaft torque at rated engine speed		807 Nm (595 lb ft)
Maximum equivalent crankshaft torque		1092 Nm (805 lb ft) at 1330 rev/min engine speed
Mean atmospheric conditions	temperature	25°C (77°F)
	pressure	990 m bar (29.25 in Hg)
	relative humidity	50%
Maximum temperature	coolant	96°C (205°F)
	engine oil	104°C (219°F)
	fuel	44°C (111°F)
	air intake	28°C (82°F)



Power take-off test.



Power take-off test.

2 DRAWBAR PERFORMANCE

Date of tests: July 1982
Type of track: Concrete

Height of drawbar above ground: Single wheels: 451 mm (17.8 in)
Dual wheels: 470 mm (18.5 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 (single wheels) Tyre inflation pressure: front 124 kPa (18 lb/in^2), rear 124 kPa (18 lb/in^2)													
A1	3.16 (1.96)	*86.5 (116.0)	98.5 (22140)	2160	15.0	-	-	47 (117)	81 (178)	87 (189)	23 (73)	83	985 (29.10)
A2	3.87 (2.41)	*106.0 (142.1)	98.5 (22140)	2135	15.0	-	-	47 (117)	82 (180)	89 (192)	23 (73)	83	985 (29.10)
A3	5.63 (3.50)	147.2 (197.4)	94.0 (21130)	2088	13.0	-	-	43 (109)	83 (181)	89 (192)	22 (72)	82	985 (29.10)
B1	6.31 (3.92)	154.5 (207.2)	88.1 (19810)	2052	11.4	-	-	42 (108)	83 (181)	91 (196)	22 (72)	82	985 (29.10)
A4	6.91 (4.29)	153.5 (205.8)	80.0 (17980)	1971	9.7	-	-	42 (108)	82 (180)	91 (196)	18 (64)	90	985 (29.10)
B2	7.79 (4.84)	157.4 (211.1)	72.7 (16340)	1971	8.6	-	-	42 (108)	83 (181)	90 (194)	19 (66)	90	985 (29.10)
C1	8.21 (5.10)	161.3 (216.3)	70.7 (15890)	1969	8.2	-	-	42 (108)	83 (181)	89 (192)	19 (66)	90	985 (29.10)
C2	10.49 (6.52)	160.9 (215.8)	55.2 (12410)	1969	6.0	-	-	42 (108)	83 (181)	88 (190)	19 (66)	90	985 (29.10)
B3	11.21 (6.97)	163.2 (218.9)	52.4 (11780)	1900	5.6	-	-	44 (111)	83 (181)	89 (192)	20 (68)	90	985 (29.10)
D1	13.37 (8.31)	163.0 (218.6)	43.9 (9870)	1902	4.4	-	-	43 (109)	83 (181)	90 (194)	20 (68)	90	985 (29.10)
(ii) MAXIMUM POWER (dual wheels) Tyre inflation pressure: front 80 kPa (12 lb/in^2), rear 80 kPa (12 lb/in^2)													
A1	3.17 (1.97)	111.5 (149.5)	126.6 (28460)	2136	12.5	0.343 (0.564)	2.42 (14.8)	42 (108)	80 (176)	85 (185)	18 (64)	90	988 (29.19)
A2	3.91 (2.43)	138.5 (185.7)	127.6 (28690)	2111	12.5	0.328 (0.539)	2.53 (15.4)	44 (111)	79 (174)	88 (190)	18 (64)	100	988 (29.19)
A3	5.64 (3.51)	163.6 (219.4)	104.4 (23470)	1972	6.9	0.288 (0.473)	2.89 (17.6)	44 (111)	83 (181)	91 (196)	19 (66)	90	988 (29.19)
B1	6.36 (3.95)	167.2 (224.2)	94.6 (21270)	1970	5.6	0.282 (0.464)	2.95 (18.0)	42 (108)	83 (181)	87 (189)	20 (68)	90	988 (29.19)
A4	7.21 (4.48)	161.5 (216.6)	80.5 (18100)	1973	4.3	0.291 (0.478)	2.86 (17.4)	45 (113)	82 (180)	90 (194)	21 (70)	90	988 (29.19)
B2	8.10 (5.03)	164.2 (220.2)	73.0 (16410)	1970	3.8	0.286 (0.470)	2.91 (17.7)	44 (111)	82 (180)	90 (194)	20 (68)	90	988 (29.19)
C1	8.50 (5.28)	168.2 (225.6)	71.2 (16010)	1971	3.6	0.279 (0.459)	2.98 (18.2)	44 (111)	83 (181)	91 (196)	20 (68)	90	988 (29.19)
C2	10.74 (6.67)	163.8 (219.7)	54.9 (12340)	1972	2.5	0.286 (0.470)	2.91 (17.7)	45 (113)	83 (181)	88 (190)	22 (72)	82	988 (29.19)
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
C1	9.26 (5.76)	137.4 (184.3)	53.4 (12000)	2110	2.2	0.304 (0.500)	2.73 (16.6)	55 (131)	83 (181)	93 (199)	28 (82)	65	988 (29.19)
(iv) +FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
A1	3.33 (2.07)	-	128.5 (28890)	-	-	-	-	50 (122)	83 (181)	92 (198)	28 (82)	71	986 (29.11)

Total oil consumption during ten hours duration of tests (iii) and (iv) 55 g/h (0.121 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

Details of wheel equipment: As in specification, without ballast

Track of wheels:

	Inner	Outer
Front	1820 mm (71.7 in)	3148 mm (123.9 in)
Rear	1820 mm (71.7 in)	3148 mm (123.9 in)

		Single wheels		Dual wheels	
		Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)		6.05 (238)	6.03 (237)	6.57 (259)	6.52 (257)
Radius of turning circle, m (in)	Front	5.26 (207)	5.25 (207)	6.07 (239)	6.01 (237)
	Rear	5.49 (216)	5.47 (215)	6.33 (249)	6.27 (247)

4. LOCATION OF CENTRE OF GRAVITY (single wheels)

Height above ground, mm (in)	1140 (44.9)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	1710 (67.3)
Distance from the median plane of the tractor, mm (in)	0

5. BRAKING

Date of tests: 21st-22nd July 1982

Type of track: Concrete

Masses during brake tests

	Front, kg (lb)	Rear, kg (lb)	Total, kg (lb)
Dual wheels	8364 (18439)	7357 (16219)	15721 (34658)
Single wheels	6654 (14670)	5720 (12610)	12374 (27280)

Type 0 Service brakes (cold)

Travelling speed before application of brakes, 35.3 km/h (21.9 mile/h)

Dual wheels	Force on brake pedal	N (lb)	240 (54)	300 (67)	360 (81)	420 (94)	480 (108)	540 (121)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	1.1 (3.6)	1.7 (5.6)	2.2 (7.2)	2.7 (8.9)	3.3 (10.8)	3.8 (12.5)	4.3 (14.1)
Single wheels	Force on brake pedal	N (lb)	240 (54)	300 (67)	360 (81)	420 (94)	480 (108)	540 (121)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2	1.5 (4.9)	2.0 (6.6)	2.6 (8.5)	3.1 (10.2)	3.6 (11.8)	4.2 (13.8)	4.7 (15.4)

Type 1 Service brakes (hot)

Dual wheels	Force on brake pedal	N (lb)	240 (54)	300 (67)	360 (81)	420 (94)	480 (108)	540 (121)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	1.6 (5.2)	2.1 (6.9)	2.7 (8.9)	3.2 (10.5)	3.7 (12.1)	4.2 (13.8)	4.7 (15.4)

Brakes were heated by: 20 applications of service brakes

Comments on deviation and vibration: None

Parking brake Transmission lock, engaged by gear selector lever

6. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 8th July 1982
Type of sound level meter: Bruel and Kjaer 2204
Type of track: Concrete
Results of tests:
Gear: D4
Travelling speed before acceleration: 26.5 km/h (16.5 mile/h)
Sound level: 89 dBA

7. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 8th July 1982
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			
*B1	40 (8990)	7.1 (4.4)	79
*B1	Light load	7.5 (4.7)	79
A1	20 (4500)	3.6 (2.2)	80
A2	70 (15740)	4.3 (2.7)	80
A4	70 (15740)	7.5 (4.7)	80
B2	50 (11240)	8.6 (5.3)	80
C1	12 (2700)	9.8 (6.1)	80
C2	20 (4500)	11.9 (7.4)	80
D4	Light load	35.3 (21.9)	80

*The B1 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: 26th July 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	271 (10.7)	789 (31.1)	40.0 (8990)	13.7 (1990)	45.1 (33264)	-
On the frame	271 (10.7)	932 (36.7)	37.9 (8520)	13.7 (1990)	65.8 (48532)	13

Temperature of hydraulic fluid at start of test 64°C (147°F)

Hydraulic pump performance

Opening pressure of the relief valve:	12.6 MPa (1830 lb/in^2)
Sustained pressure with relief valve open:	15.5 MPa (2250 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:	103.6 l/min (22.8 gal/min)
Pressure specified by the manufacturer for an external hydraulic motor:	12.5 MPa (1810 lb/in^2)
Hydraulic power at 12.5 MPa (1810 lb/in^2):	24.9 kW (33.4 hp)
Pump delivery rate at stated power:	119.5 l/min (26.3 gal/min)
Tapping points:	Two outlets at rear of tractor
Temperature of hydraulic fluid:	69°C (156°F)

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

Projected length in side view				
Lower links	970 (38.2)			
Lift arms	468 (18.4)			
Lift rods	897 (35.3)			
Top link	745 (29.3)			
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	157 (6.2)	behind,	336 (13.2)	below
Top link pivot point	384 (15.1)	behind,	172 (6.8)	above
Lift arm pivot point	On centre line,		327 (12.9)	above
Maximum and minimum height of lower link hitch points	205 (8.1)	above,	584 (23.0)	below
Height of lower link hitch points when locked in transport position	Any height within lift range			

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS:

The 'Ballasted' tests were carried out with the tractor fitted with dual wheels and without additional ballast. This condition gives 90% of the manufacturer's maximum allowable tractor mass and is recommended for field work.

The tractor was fitted with single wheels for the 'unballasted' tests. In this condition, with the largest capacity tyres fitted, the front wheels had a static overload of 8% (see manufacturer's note).

Test carried out by: N.R. Baker

Signed: D W Smith Head of Tractor Test Section

for the Director

Date: 23rd August 1982

Manufacturer's Note

The overload on single tyres (8%) falls within the overload allowed by tyre manufacturers for transport; however, transport speed should not exceed 15 mph.

Dual tyres are recommended for field work where tyre carrying capacity allows added ballast to control drive wheel slip.