OECD Approval No. 854

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

Report on test of Ford 4610 Tractor



Manufactured by Ford Motor Company Ltd.,
Basildon,
Essex.

Test No. R82/70007/OECD

Report No. 687

Date September 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
SPECIFICATION OF TRACTOR		1
CONDITIONS DURING TEST		8
FUEL AND LUBRICANTS USED IN TESTS		8
COMPULSORY TESTS		
1	Main power take-off performance	9
2	Drawbar performance	13
3	Turning space and turning circle	14
4	Location of centre of gravity	14
5	Braking	14
6	Measurement of external noise level	15
7	Noise measurement at the driver's ear	16
8	Power lift and hydraulic pump performance	16
REPAIRS AND ADJUSTMENTS DURING TESTS		18
REMARKS		18

SPECIFICATION OF TRACTOR

Manufacturer's name and address:	Ford Motor Company Ltd., Basildon, Essex
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running-in:	Basildon
Duration of running-in:	123 hours

Tractor

Make:	Ford
Model:	4610
Type:	Four-wheel, rear wheel driven, unit construction
Serial No.:	C 681207

Engine

Make:	Ford
Model:	4610
Type:	4-stroke, direct injection diesel
Serial No.:	D627302
Cylinders:	
Number and disposition:	3, vertical, in-line
Bore:	111.8 mm (4.4 in)
Stroke:	111.8 mm (4.4 in)
Capacity:	3292 cm^2 (201 in^3)
Compression ratio:	16.3:1 (nominal)
Arrangement of valves:	Overhead
Liners:	None, Monobloc construction
Fuel system:	
Feed system:	Gravity
Make, type and model of filter(s):	Plastic strainer in tank and C.A.V. paper element filter with sediment bowl and water trap between tank and injection pump
Tank capacity:	60.5 l (13.3 UK gal)
Make, type and model of injection pump:	Lucas C.A.V., DPA 3233 F980, 2 roller distributor
Injection pump Serial No.:	R21035WY
Manufacturer's production setting of injection pump:	Master pump + 3%; delivery obtained from master pump during pre-test fuel checks, 13.8-14.6 cm^3 for 200 injections at 600 rev/min pump speed, using Shell calibration fluid C at 38-42°C (100-108°F), specific gravity 0.817 at 40°C (104°F) (test bench figures)

Fuel system (cont'd)	
Make, type and model of injectors:	C.A.V., multihole, 5222304
Injection pressure:	19.4-19.9 MPa (191-196 atm)
Injection pump delivery starts:	16° before T.D.C.
Governor:	
Make and type:	C.A.V., mechanical, incorporated in fuel injection pump
Governed range of engine speed:	600 rev/min to 2475 rev/min
Rated engine speed:	2200 rev/min
Air cleaner:	
Make and type:	Locker Air Maze, dry, paper element
Model:	3-stage
Oil capacity	None
Position:	Under front hood, forward of radiator
Pre-cleaner:	
Make and type:	Ford, centrifugal
Position:	Above front hood
Turbocharger:	
Make and type:	None
Lubrication system:	
Type of feed and pump:	Force feed from eccentric rotor pump
Type of filter(s):	Metal strainer in sump, full flow replaceable paper element filter
Total oil capacity including filter:	6.6 l (11.7 pt)
Recommended oil:	S.A.E. 20W, viscosity 45 cSt at 50°C (122°F)
M.I.L. standard:	L-2104-C
Oil change period:	300 hours
Filter change period:	300 hours
Cooling system:	
Coolant:	Water and antifreeze, 50% solution
Type of pump:	Centrifugal impeller
Fan diameter:	406 mm (16.0 in)
Number of fan blades:	4
Type of temperature control:	Thermostat
Coolant capacity:	10.4 l (18.3 pt)
System pressure:	50 kPa (7 lb/in^2)
Starting system:	
Make, type and model:	Lucas electric motor M50G 12V, positive engagement, solenoid operated
Starter motor power rating:	1.8 kW (2.4 hp)

Starting system (cont'd)

Safety features:	Only operable when gear lever is in neutral position
Cold starting aid:	C.A.V. Thermostart

Exhaust system

Make and construction:	Burgess, double chamber
Dimensions of expansion chamber:	115 mm (4.5 in) x 229 (9.0 in) 380 mm (15.0 in) long
Position:	Vertical above left-hand hood

Electrical system

Voltage:	12
Earth polarity:	Negative
Make and type of generator:	Lucas, 18 ACR, alternator
Output:	45 A at 6000 rev/min
Make and type of battery:	Ford, lead-acid
Rating:	120-128 Ah at 20 hour rating

Transmission:

Clutch:

Make and type:	Borg and Beck, dry, single plate
Diameter of plate:	279 mm (11.0 in)
Method of operation:	Pedal

Gearbox:

Make and type:	Ford, constant mesh
Number of speeds:	8 forward and 4 reverse
Arrangement:	4 forward speeds, with synchromesh, high/low and reverse range selector

Rear axle and final drive(s):

Make and type:	Ford, crown wheel and pinion with differential and epicyclic reduction gear final drives
Type of differential lock and method of engagement:	Mechanical, pedal operated, self-disengaging

Front axle and final drive(s):

Make and type:	Not driven

Transmission oils

	Gearbox	Rear axle
Recommended oil: S.A.E.	80 EP	80 EP
Capacity:	9.4 l (16.5 pt)	45.7 l (80.4 pt)
Viscosity at 50°C (122°F)	54 cSt	54 cSt
M.I.L. standard	L-2105	L-2105
Oil change period	1200 hours	1200 hours
Filter change period	None	300 hours

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 Low 1	209.46	2.83	(1.76)
2	143.99	4.12	(2.56)
3	98.45	6.02	(3.74)
4	67.68	8.76	(5.44)
High 1	59.28	10.00	(6.21)
2	40.76	14.55	(9.04)
3	27.86	21.29	(13.23)
4	19.16	30.95	(19.23)
Reverse 1	162.16	3.66	(2.27)
2	111.48	5.32	(3.31)
3	76.22	7.78	(4.83)
4	52.40	11.32	(7.03)

* Calculated with a tyre radius index of 715 mm (28.1 in)

Power take-off

Position:	At rear of tractor in vertical centre plane
Height above ground:	602 mm (23.7 in)
Distance behind rear axle:	406 mm (16.0 in)
Diameter:	34.9 mm (1.375 in)
Number of splines:	6 to I.S.O. 500
Proportional engine speed pto:	Independent of main clutch
Method of engagement:	Lever and hydraulically operated multi-plate clutch
Speed at rated engine speed:	660 rev/min
Engine speed at standard pto speed of 540 rev/min:	1800 rev/min
Direction of rotation (viewed facing driving end):	Clockwise
Belt pulley	None fitted

Power lift

Make and type of pump:	Sundstrand, live, gear
Nominal working pressure:	13.8 MPa (2000 lb/in^2)
Pump drive:	From pto shaft, independent of main and pto clutches
Oil supplied from:	Rear axle housing
Oil capacity:	45.7 l (80.4 pt)
Oil capacity available for external use:	27.3 l (48.0 pt) with tractor horizontal
Permissible additional fill for external use:	22.7 l (40.0 pt)
Number of rams:	One internal, two external
Type, number and position of external tappings:	One, from top of auxiliary service control valve
Linkage category:	2, to I.S.O. 730/1
Controls:	Draught or position control with auxiliary service control, with top link sensing

Drawbar

Type:	Swinging
Vertical height to centre of clevis:	max. 569 mm (22.4 in), min. 334 mm (13.1 in)
Changed by:	Inverting drawbar
Distance behind rear axle centre:	645 mm (25.4 in) and 759 mm (29.9 in)
Distance behind pto:	248 mm (9.8 in) and 362 mm (14.3 in)
Lateral adjustment:	381 mm (15.0 in) and 451 mm (17.8 in)
Pivot position relative to rear axle:	On rear wheel centre line
Drawbar pin hole diameter:	27 mm (1.1 in)
Type:	Linkage
Vertical height to centre of hake bar:	max. 962 mm (37.9 in), min 282 mm (11.1 in) above ground, at lift rod length 757 mm (29.8 in)
Changed by:	Position of hydraulic lift lever
Lift rod length adjustment:	813 mm (32.0 in) to 711 mm (28.0 in)
Dimensions with lower links horizontal:	
Distance behind rear axle centre:	932 mm (36.7 in)
Distance behind pto:	526 mm (20.7 in)
Lateral adjustment:	508 mm (20.0 in)
Pivot position relative to rear axle:	68 mm (2.7 in) rearwards
Drawbar pin hole diameter:	20 mm (0.8 in)
No. of holes:	Central hole with 5 holes each side, 50.8 mm (2.0 in) apart

Hitch

Type and position:	Rear, automatic pick-up hitch, adjustable height rear tow hook available, not fitted for test

Steering

Make and type:	Burman, recirculating ball with single drop arm and drag link
Make and type of pump:	None

Brakes

Make and type:	Girling, oil-immersed multi-plate discs
Position:	On rear axle planetary shafts
Method of operation:	Independent or combined pedal, mechanical linkage
Type of parking brake:	Mechanical linkage coupled to both service brakes
Method of operation:	Hand-lever with ratchet

Wheels

Steering wheels:

Make and size:	Goodyear 7.50-16
Type:	Cross-ply, 6 ply rating
Maximum mass on each tyre and pressure:	745 kg (1642 lb) at 280 kPa (41 lb/in^2)
Track width:	1380 mm (54 in) by 102 mm (4.0 in) steps to 2094 mm (82 in)
Changed by:	Extending axle and reversing wheels

Driving wheels:

Make and size:	Kleber Super 50, 13.6-36
Type:	Radial-ply, 6 ply rating, rim size W12
Maximum mass on each tyre and pressure:	1615 kg (3560 lb) at 160 kPa (23 lb/in^2)
Track width:	1422 mm (56 in) by 102 mm (4.0 in) steps to 2034 mm (80 in)
Changed by:	Reversing wheels and off-set lug rims

Wheelbase

2146 mm (84.5 in)

Safety Cab

None

Lighting

Unrestricted beam angle of headlight in plan view 130°.

	Height above ground of centre, mm	(in)	Size, mm	(in)	Distance from outside edge of tractor at 1422 mm (56 in) wheel track, to centre, mm	(in)
Headlights	969	(38.1)	102	(4.0) dia	738	(29.1)
Side lights	1548	(60.9)	70 x 70	(2.8) x (2.8)	265	(10.4)
Rear lights	1523	(60.0)	70 x 70	(2.8) x (2.8)	222	(8.7)
Reflectors	1461	(57.5)	180 x 40	(7.1) x (1.6)	189	(7.4)

Number of grease points

Whole tractor: 11

Overall dimensions:

	Length, m	(in)	Width, max. m	(in)	Width, min. m	(in)	Maximum height to top of exhaust, m	(in)
Without ballast	3.52	(139)	2.38	(94)	1.77	(70)	2.71	(107)
With ballast	3.78	(149)	2.63	(104)	2.02	(80)	2.70	(106)

Minimum ground clearance 375 mm (14.8 in) to underside of drawbar frame

Seat

Make and type: Grammer, upholstered pan and back rest

Suspension: Coil spring

Damping: Pneumatic, adjustable for driver's weight

Range of adjustment: longitudinal 136 mm (5.4 in)

vertical None

CONDITIONS DURING TEST

Masses

Tractor (without driver but with tanks full)

	Front, kg (lb)	Rear, kg (lb)	Total, kg (lb)
Without ballast	773 (1704)	1437 (3168)	2210 (4872)
With ballast	914 (2015)	2159 (4760)	3073 (6775)

Ballast

	Number of weights	Total mass, kg (lb)	Water, kg (lb)
Front wheels	Nil	Nil	Nil
Rear wheels	6	300 (661)	455 (1003)
Additional	Front weight frame only	108 (238)	Nil

Track setting during tests

Front - 1375 mm (54 in)

Rear - 1422 mm (56 in)

FUEL AND LUBRICANTS USED IN TESTS

Fuel

Diesel oil to Class D British Standard 2869:1970, specific gravity 0.8495 at 15°C (59°F), viscosity 2.64 cSt at 50°C (122°F), Cetane No. 53

Oils

Engine: Ford, M2C-121A, S.A.E. 20W viscosity 45 cSt at 50°C (122°F)

Gearbox: Ford, M2C-85A, S.A.E. 80EP, viscosity 54 cSt at 50°C (122°F)

Rear axle and hydraulics: Ford, M2C-86B, S.A.E. 80EP, viscosity 54 cSt at 50°C (122°F)

COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 2nd August 1982, NIAE, Silsoe, Bedford, UK

Type of dynamometer: Water brake, Heenan and Froude

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						
42.3 (56.8)	2200	660	12.91 (2.84)	10.96 (24.17)	0.259 (0.426)	3.28 (20.0)
The speed recommended by the manufacturer for drawbar work						
42.3 (56.8)	2200	660	12.91 (2.84)	10.96 (24.17)	0.259 (0.426)	3.28 (20.0)
Part loads						
(1) 85% of the torque obtained at maximum power						
36.9 (49.5)	2256	677	11.28 (2.48)	9.58 (21.12)	0.260 (0.427)	3.27 (19.9)
(2) Unloaded						
0	2326	698	3.38 (0.74)	2.87 (6.33)	-	-
(3) 50% of the torque defined in (1)						
18.8 (25.2)	2300	690	6.93 (1.52)	5.88 (12.97)	0.313 (0.515)	2.71 (16.5)
(4) Maximum power						
42.3 (56.8)	2200	660	12.91 (2.84)	10.96 (24.17)	0.259 (0.426)	3.28 (20.0)
(5) 25% of the torque defined in (1)						
9.5 (12.8)	2316	695	5.17 (1.14)	4.39 (9.68)	0.462 (0.759)	1.84 (11.2)
(6) 75% of the torque defined in (1)						
28.0 (37.5)	2280	684	9.14 (2.01)	7.76 (17.12)	0.277 (0.456)	3.06 (18.7)

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 (540 rev/min)						
(1) 85% of the torque obtained at maximum power						
32.5 (43.6)	1852	556	9.39 (2.06)	7.97 (17.58)	0.245 (0.403)	3.47 (21.1)
(2) Unloaded						
0	1967	590	2.46 (0.54)	2.09 (4.61)	-	-
(3) 50% of the torque defined in (1)						
16.8 (22.5)	1910	573	5.66 (1.25)	4.81 (10.61)	0.286 (0.471)	2.97 (18.1)
(4) Maximum power						
37.2 (49.9)	1800	540	10.89 (2.40)	9.25 (20.40)	0.249 (0.409)	3.42 (20.8)
(5) 25% of the torque defined in (1)						
8.5 (11.5)	1941	582	4.05 (0.89)	3.44 (7.59)	0.403 (0.663)	2.11 (12.8)
(6) 75% of the torque defined in (1)						
24.8 (33.3)	1885	566	7.44 (1.64)	6.32 (13.93)	0.255 (0.419)	3.34 (20.3)

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

(a) 0.260 (0.427) (b) 0.313 (0.515) (c) 0.245 (0.403) (d) 0.286 (0.471)

No load, maximum engine speed 2326 rev/min

Equivalent crankshaft torque at maximum power 183.6 Nm (135.4 lb ft)

Maximum equivalent crankshaft torque 209.0 Nm (154.2 lb ft) at 1300 rev/min engine speed

Mean atmospheric conditions temperature 26 °C (79 °F)

pressure 1012 m bar (29.88 in Hg)

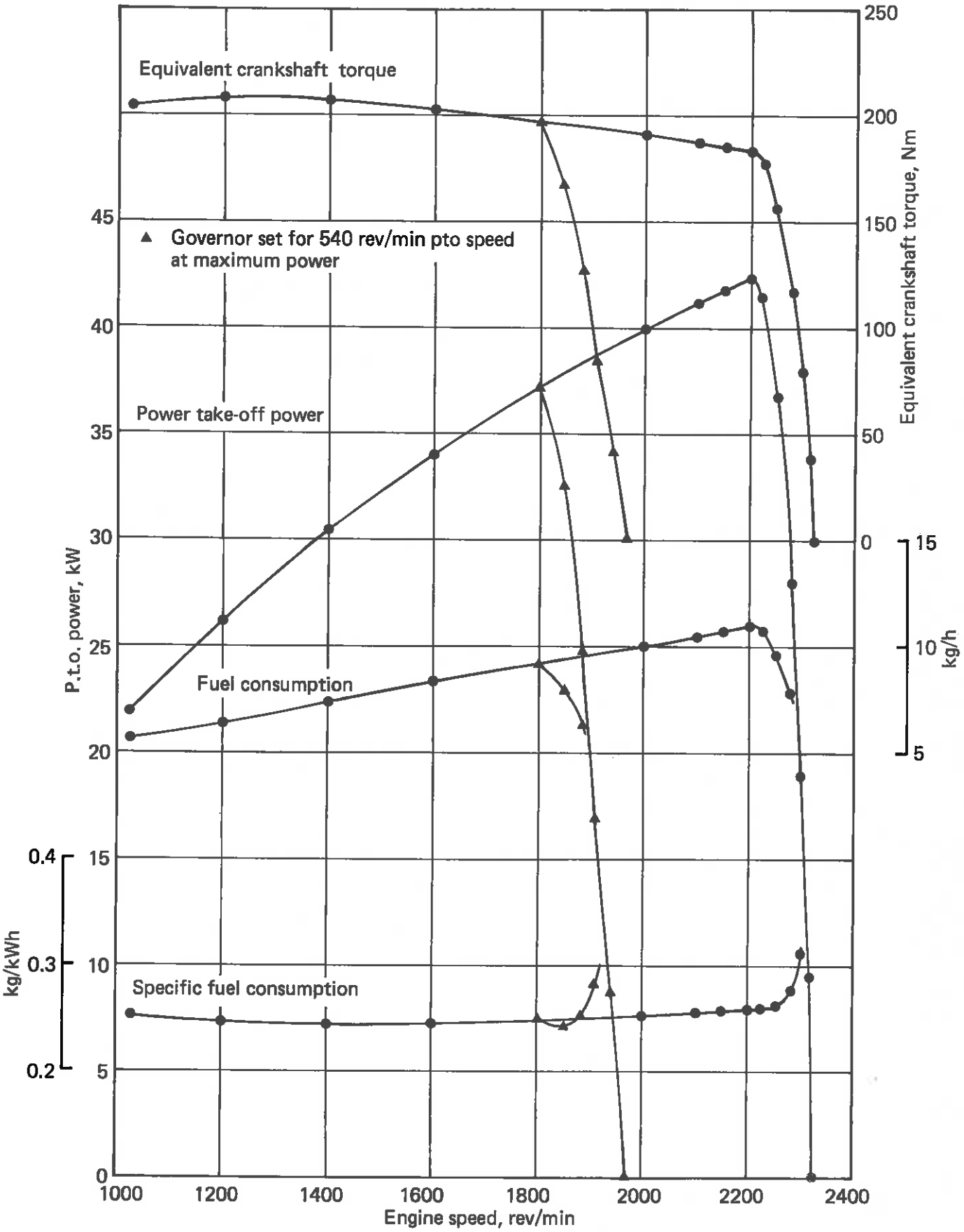
relative humidity 64 %

Maximum temperature coolant 96 °C (205 °F)

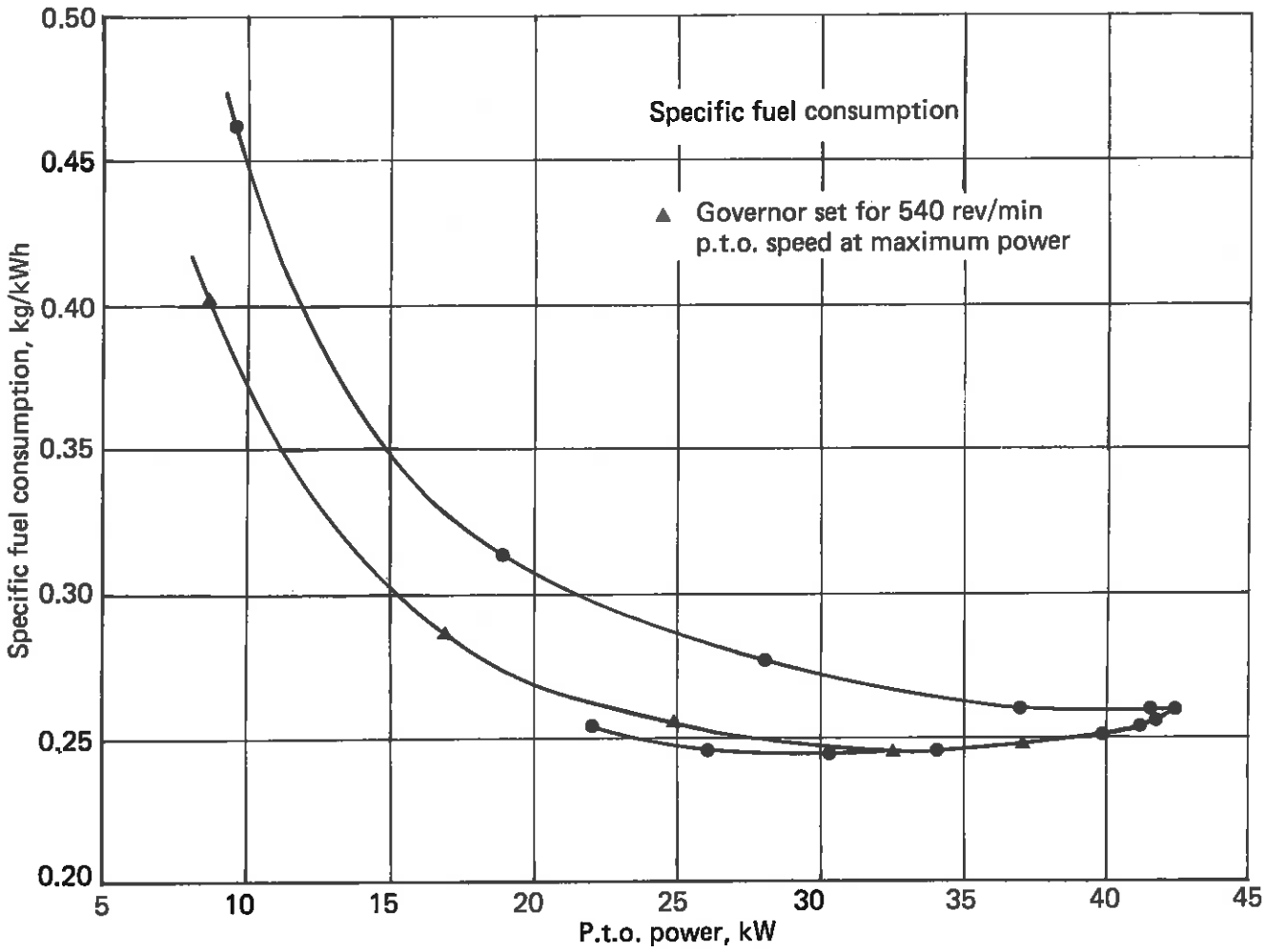
engine oil 108 °C (226 °F)

fuel 54 °C (129 °F)

air intake 27 °C (81 °F)



Power take-off test



Power take-off test

2 DRAWBAR PERFORMANCE

Date of tests: ..17th and 25th August 1982

Type of track: ..Concrete.....

Height of drawbar above ground: Unballasted: ...440... mm (..17,3 in)
Ballasted: ...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)	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)
(i) MAXIMUM POWER (unballasted) Tyre inflation pressure: front 150 kPa (22 lb/in^2), rear 80 kPa (12 lb/in^2)													
L2	3.69 (2.29)	*20.4 (27.3)	19.9 (4470)	2290	15.0	-	-	30 (87)	75 (168)	90 (195)	19 (66)	49	1009 (29.82)
L3	5.25 (3.26)	*29.0 (38.9)	19.9 (4470)	2263	15.0	-	-	28 (82)	75 (168)	91 (197)	18 (65)	54	1009 (29.82)
L4	8.11 (5.04)	35.5 (47.6)	15.8 (3540)	2203	8.7	-	-	30 (87)	77 (171)	90 (195)	18 (65)	48	1009 (29.82)
H1	9.33 (5.80)	36.3 (48.7)	14.0 (3140)	2211	7.5	-	-	35 (96)	81 (178)	93 (200)	18 (65)	53	1009 (29.82)
H2	14.00 (8.70)	37.3 (50.0)	9.6 (2150)	2209	5.3			36 (98)	80 (177)	92 (198)	19 (67)	51	1009 (29.82)
(ii) MAXIMUM POWER (ballasted) Tyre inflation pressure: front 150 kPa (22 lb/in^2), rear 80 kPa (12 lb/in^2)													
L1	2.51 (1.56)	*19.1 (25.7)	27.4 (6160)	2297	15.0	0.365 (0.600)	2.33 (14.2)	31 (89)	75 (167)	91 (196)	18 (65)	65	1015 (29.97)
L2	3.60 (2.23)	*27.3 (36.7)	27.4 (6160)	2273	15.0	0.339 (0.558)	2.50 (15.3)	30 (87)	74 (166)	91 (196)	16 (62)	65	1015 (29.97)
L3	5.47 (3.40)	35.9 (48.1)	23.6 (5300)	2207	8.8	0.317 (0.521)	2.68 (16.4)	26 (80)	77 (171)	86 (188)	15 (59)	69	1010 (29.84)
L4	8.27 (5.14)	36.5 (49.0)	15.9 (3570)	2208	5.2	0.314 (0.517)	2.71 (16.5)	27 (81)	78 (173)	90 (194)	14 (58)	68	1010 (29.84)
H1	9.53 (5.92)	37.3 (50.0)	14.1 (3160)	2214	4.6	0.302 (0.496)	2.82 (17.2)	28 (82)	76 (168)	91 (196)	14 (58)	68	1010 (29.84)
H2	13.97 (8.68)	37.2 (49.9)	9.6 (2150)	2204	3.4	0.310 (0.510)	2.74 (16.7)	27 (81)	78 (173)	93 (200)	14 (58)	68	1010 (29.84)
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
H1	9.93 (6.17)	29.3 (39.3)	10.6 (2380)	2275	3.7	0.298 (0.490)	2.85 (17.4)	32 (90)	75 (167)	95 (203)	15 (59)	63	1002 (29.61)
+(iv) FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
L2	3.74 (2.32)	-	27.4 (6160)	2266	-	-	-	34 (94)	75 (168)	97 (208)	17 (63)	51	1000 (29.53)

Total oil consumption during ten hours duration of tests (iii) and (iv) 21.5 g/h (0.047 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: front - 1375 mm (54 in)
rear - 1422 mm (56 in)

	With brakes		Without brakes	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)	3.49 (137)	3.26 (128)	3.86 (152)	3.78 (149)
Radius of turning circle, m (in)	3.38 (133)	3.15 (124)	3.75 (148)	3.67 (144)

4. LOCATION OF CENTRE OF GRAVITY

Height above ground, mm (in)	711 (28.0)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	737 (29.0)
Distance from the median plane of the tractor, mm (in)	0

5. BRAKING

Date of tests: 6th-8th September 1982

Type of track: Concrete

Masses during brake tests

	Front, kg (lb)	Rear, kg (lb)	Total, kg (lb)
Ballasted	1510 (3329)	2305 (5082)	3815 (8411)
Unballasted	773 (1704)	1437 (3168)	2210 (4872)

Tyres:

Front: 7.50-16, 6-ply rating

Rear: 13.6-36, 6-ply rating

Type 0 Service brakes (cold)

Travelling speed before application of brakes, 32.3 km/h (20.1 mile/h)

Ballasted	Force on brake pedal	N (lb)	75 (17)	150 (34)	225 (51)	300 (67)	375 (84)	450 (101)	470 (106)
	Mean deceleration	m/s^2 (ft/s^2)	1.5 (4.9)	1.9 (6.2)	2.4 (7.9)	2.9 (9.5)	3.4 (11.2)	3.9 (12.8)	4.0 (13.1)
Unballasted	Force on brake pedal	N (lb)	50 (11)	100 (22)	150 (34)	200 (45)	250 (56)		
	Mean deceleration	m/s^2 (ft/s^2)	1.9 (6.2)	2.4 (7.9)	3.0 (9.8)	3.5 (11.5)	4.0 (13.1)		

Type 1 Service brakes (hot)

Ballasted	Force on brake pedal	N (lb)	75 (17)	150 (34)	225 (51)	300 (67)	375 (84)	450 (101)	
	Mean deceleration	m/s^2 (ft/s^2)	1.5 (4.9)	1.9 (6.2)	2.4 (7.9)	2.9 (9.5)	3.4 (11.2)	3.9 (12.8)	

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 2.21 tonnes (4870 lb)	
		Up	Down	Up	Down
Pull on handbrake	N (lb)	170 (38)	170 (38)	150 (34)	150 (34)

6. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests: 12th August 1982
Type of sound level meter: Bruel & Kjaer 2209
Type of track: Concrete
Results of tests:
Gear: H4
Travelling speed before acceleration: 24.2 km/h (15.0 mile/h)
Sound level: 89 dBA

7. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests: 12th August 1982
Type of sound level meter: Bruel & Kjaer 2209
Type of track: Concrete
Cab fitted: No

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
* L3	17.0 (3820)	5.7 (3.5)	96
* L3	Light load	6.3 (3.9)	93
L4	14.0 (3150)	7.4 (4.6)	97
H2	10.0 (2250)	13.4 (8.3)	97
H4	Light load	32.3 (20.1)	94

*The L3 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: 13th September 1982
Hydraulic fluid:
Make and type: Ford M2C 86-B
Viscosity: 54 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	282 (11.1)	680 (26.8)	18.9 (4250)	15.8 (2290)	17.6 (12981)	-
On the frame	282 (11.1)	895 (35.2)	15.8 (3550)	15.8 (2290)	24.4 (17996)	22

Hydraulic pump performance

Opening pressure of the relief valve:	14.0 MPa (2030 lb/in^2)
Sustained pressure with relief valve open:	17.6 MPa (2550 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:	29.1 l/min (6.4 gal/min)
Pressure specified by the manufacturer for an external hydraulic motor:	13.8 MPa (2000 lb/in^2)
Hydraulic power at 13.8 MPa (2000 lb/in^2):	7.3 kW (9.8 hp)
Pump delivery rate at stated power:	31.7 l/min (7.0 gal/min)
Tapping point:	Auxiliary service connection
Temperature of hydraulic fluid:	64°C (147°F)

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

Projected length in side view					
Lower links	864	(34.0)			
Lift arms	254	(10.0)			
Lift rods	757	(29.8)			
Top link	678	(26.7)			
Distance of lift rod connection point from pivot point of lower link	480	(18.9)			
The following dimensions are given relative to the rear wheel centre line, situated 715 mm (28.1 in) above the ground level					
Lower link pivot point	68	(2.7) behind,	203	(8.0)	below
Top link pivot point	262	(10.3) behind,	153	(6.0)	above
Lift arm pivot point	203	(8.0) forward,	257	(10.1)	above
Maximum and minimum height of lower link hitch points	247	(9.7) above,	433	(17.0)	below
Height of lower link hitch points when locked in transport position	Any height within lift range				

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

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

Signed: J.P. Evans. H.P. Head of Tractor Test Section

for the Director

Date: 28th Sept 1982.