OECD Approval No. 989

Date of approval: 18th February 1986

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

Report on test of Zetor 7711 Tractor with Two-Wheel Drive



Manufactured by	Agrozet-Zetor, Brno, Czechoslovakia.
Test No.	R85/70503/OECD
Report No.	707
Date	October 1985

THE BRITISH SOCIETY FOR RESEARCH IN AGRICULTURAL ENGINEERING

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Tractor manufacturer's name and address:	Agrozet - Zetor Brno Czechoslovakia.
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running in:	Agrozet - Zetor, Brno, Czechoslovakia
Duration of running in:	60 hours

I. SPECIFICATION OF TRACTOR

TRACTOR

Make:	Zetor
Trade name:	Zetor
Model:	7711
Type:	2-wheel drive, unit construction
Serial No:	000624
1st Serial No:	000620

ENGINE

Make:	Zbrojovka, Brno
Model:	7701
Type:	4-stroke, direct injection diesel
Serial No:	000005
Cylinders	
Number/disposition:	4, vertical in-line
Bore/stroke:	102 mm x 120 mm (4.0 in x 4.7 in)
Capacity:	3922 cm^3 (239 in^3)
Compression ratio:	17:1 nominal
Arrangement of valves:	Overhead
Cylinder liners:	Replaceable, wet
Supercharging	None

Fuel System

Fuel feed system:	Lift pump integral with fuel injection pump
Make, type and model of fuel filter(s):	Autobrzdy, dual, 443741429000
Capacity of fuel tank:	70 l (15.4 UK gal)
Make, type and model of injection pump:	Motorpal, in-line, PP4Me
Serial No:	PP4M9K 1e V6579
Manufacturer's production setting of injection pump:	13.7 - 14.7 l/h (24.1 - 25.9 UK pt/h) at 56°C (133°F), 2200 rev/min engine speed at full load
Injection pump timing:	Delivery starts 25.5 +1° before T.D.C.
Make, type and model of injectors:	Motorpal. VA 2682 TP 0463, 4 hole
Injection pressure:	16.5 - 17.3 MPa (163 - 171 atm)

Governor

Make:	Motorpal
Type:	Mechanical
Model:	RV 3M 300/1100 2554
Governed range of engine speed:	600 - 2410 rev/min
Rated engine speed:	2200 rev/min

Air cleaner

Pre-cleaner	
Make:	Sandrik
Type:	Centrifugal
Model:	PC 250
Location:	Under bonnet forward of radiator
Main	
Make:	Sandrik
Type:	Oil bath
Model:	9420.11
Oil capacity:	1.3 l (2.3 UK pt)
Location:	Under bonnet forward of radiator
Maintenance indicator:	None

Lubrication system

Type of feed pump:	Gear
Total oil capacity including filter(s):	12.0 l (21.1 UK pt)
Oil change period:	200 hours
Type of filter(s):	Metal strainer in sump, single full flow centrifugal RHP 2/A filter
Filter service period:	200 hours
Recommended oil:	See "Fuels and lubricants used in tests"

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:	6
Fan diameter:	380 mm (15.0 in)
Coolant capacity:	11.6 l (20.4 UK pt)
Type of temperature control:	Thermostat
Superpressure system:	40 ±1 kPa (4.4 - 7.2 lb/in^2)
Starting system	
Safety device:	Clutch pedal to be fully depressed
Make:	Pal-Magneton
Type:	Electrical, solenoid engaged
Model and starter motor power rating:	443 115 144 722, 2.9 kW (3.9 hp)
Cold starting aid:	Automatic device for increasing fuel delivery incorporated in fuel injection pump when governor control lever is fully open
Electrical system	
Voltage:	12
Generator:	Alternator
Make:	Pal-Magneton
Model:	X443 113 516 186
Type:	14V, 55A
Power:	55 A at 8000 rev/min
Battery	1, Akuma, lead-acid accumulator
Rating:	150 Ah at 20 hour rating
Exhaust system	
Make:	Zetor
Type:	Oval, baffle
Location:	Left-hand side of bonnet, vertical
Height of outlet above ground:	2.39 m (94 in)

TRANSMISSION

Clutch	
Make:	Zbrojovka
Type:	Dry, for transmission and p.t.o.
Number of plates:	2
Diameter of plates:	280 mm (11.0 in) main and 280 mm (11.0 in) p.t.o.
Method of operation:	Hydraulically by pedal for gearbox and hand lever for p.t.o. drive
Gear box	
Make:	Zetor
Type:	Mechanical
Arrangement:	5 forward x 2 ranges x torque multiplier 1 reverse x 2 ranges x torque multiplier
Number of speeds:	20 forward and 4 reverse
Rear axle and final drives	
Make:	Zetor
Type:	Crown wheel and pinion differential and spur gear final drives
Differential lock	
Type:	Mechanical
Method of engagement:	Manual by pedal
Method of disengagement:	Self disengaging
Transmission oils	
Capacity	
Gear box and transmission housing:	27.0 l (47.5 UK pt) including oil for hydraulics
Change period:	1200 hours
Filter change period:	600 hours
Final drive(s):	2 x 1.9 l (6.7 UK pt)
Change period:	1200 hours
Type of filter:	Paper element and magnetic suction filter
Recommended oil:	See "Fuels and lubricants used in tests"

Gear	Group 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				
1	LM	408.11	1.41	(0.88)
2	LM	313.83	1.84	(1.14)
1	L	310.87	1.85	(1.15)
2	L	238.90	2.41	(1.50)
3	LM	225.06	2.56	(1.59)
3	L	171.43	3.36	(2.09)
4	LM	158.09	3.65	(2.27)
4	L	120.42	4.79	(2.98)
5	LM	115.23	5.00	(3.11)
1	HM	96.36	5.98	(3.72
5	L	87.77	6.57	(4.08)
2	HM	74.05	7.78	(4.83)
1	H	73.40	7.85	(4.88)
2	H	56.41	10.22	(6.35)
3	HM	53.14	10.85	(6.74)
3	H	40.48	14.24	(8.85)
4	HM	37.33	15.44	(9.59)
4	H	28.43	20.27	(12.60)
5	HM	27.21	21.19	(13.17)
5	H	20.72	27.81	(17.28)
Reverse				
R	LM	306.98	1.90	(1.18)
R	L	233.83	2.48	(1.54)
R	HM	72.48	8.03	(4.99)
R	H	55.21	10.51	(6.53)

M = Torque multiplier engaged L = Low range H = High range
Rear tyre size: 16.9 - 30
Tyre loaded radius: 695 mm (27.4 in)

POWER TAKE-OFF

Main power take-off

Type: Independent, mechanically operated, through second plate in 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:	705 mm (27.8 in)
Tyre sizes, Front, Rear:	7.5-16, 16.9-30
Distance from the median plane of the tractor:	Central
Distance behind rear axle centre:	260 mm (10.2 in)
Pto speed at rated engine speed:	596 rev/min
Engine speed at standard power take-off speed:	1994 rev/min
Engine to pto ratio:	3.692 : 1
Power restriction:	48.0 kW (64.4 hp) to ISO 500 - 1979 (E)
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:	705 mm (27.8 in)
Tyre sizes, Front, Rear:	7.5-16, 16.9-30
Distance from the median plane of the tractor:	Central
Distance behind rear axle centre:	260 mm (10.2 in)
Pto speed at rated engine speed:	1073 rev/min
Engine speed at standard power take-off speed:	2050 rev/min
Engine to pto ratio:	2.05 : 1
Direction of rotation (viewed facing driving end):	Clockwise

Power take-off proportional to ground speed

Speed of shaft:	1000 rev/min or 540 rev/min
Size of tyre:	16.9-30
Travelling distance for one revolution of power take-off shaft:	81.7 mm (3.2 in) or 344.9 mm (13.6 in)
Number of pto shaft revolutions for one revolution rear wheels:	53.46 or 12.66
Direction of rotation with forward gear engaged:	Clockwise

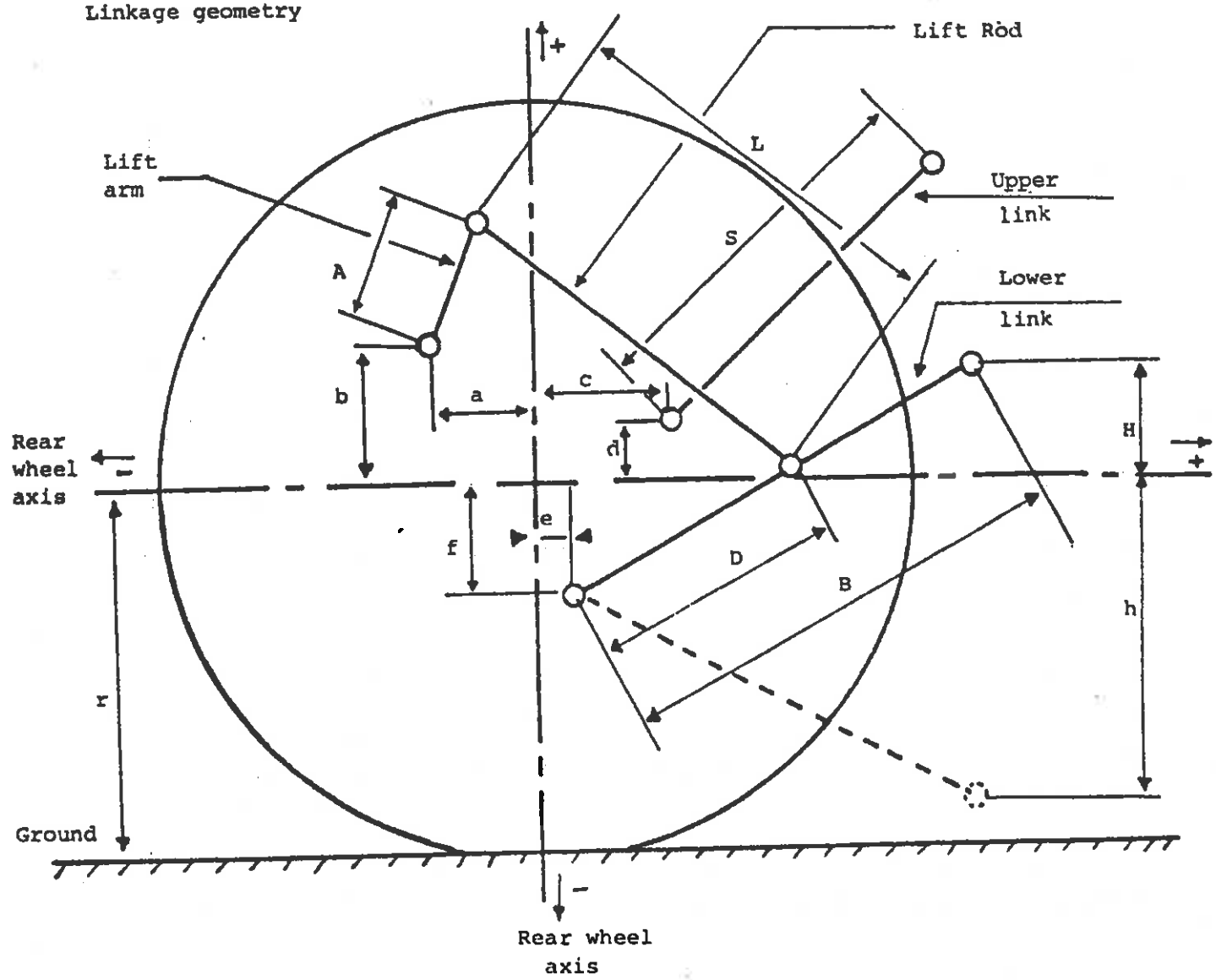
POWER LIFT

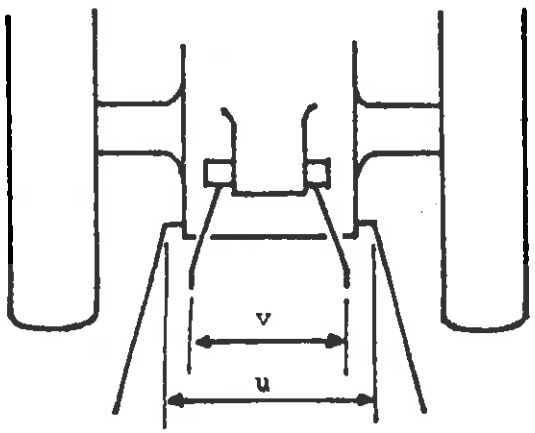
Make:	Zetor
Type:	7011 9480
Type and number of cylinders:	One internal single acting, one external single acting
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	16.0 - 18.0 MPa (2320 - 2610 lb/in^2)
Opening pressure of cylinder safety valve:	20.0 - 22.0 MPa (2900 - 3190 lb/in^2)
Lift pump type:	Gear, 7011 4600
Transmission between pump and engine:	Gear-driven
Make and number of filters:	Own make, one paper element and magnetic suction filter
Time between oil changes:	1200 hours
Time between filter changes:	600 hours
Oil capacity:	27.0 l (47.5 UK pt)
Site of oil reservoir:	Main transmission housing
Type and number of tapping points:	3, quick release at rear of tractor
Maximum volume of oil available to external cylinders:	15.0 l (26.4 UK pt
Recommended oil:	See "Fuels and lubricants used in tests"

THREE-POINT LINKAGE

Category:	2 to ISO standard
Controls	Draught or position control top link sensing

Linkage geometry





Linkage dimensions for the lifting test

Rear tyres: (size 16.9-30) loaded radius:		(r) 695 mm (27.3 in)
Front tyres:(size 7.50-16) loaded radius:		(r')370 mm (14.6 in)
Length of lift arms:		(A) 320 mm (12.6 in)
Length of lower links:		(B) 860 mm (33.9 in)
Distance of lift arm pivot point from rear wheel centre line:	horizontally:	(a) 30 mm (1.2 in)
	vertically:	(b) 363 mm (14.3 in)
Horizontal distance between the two lower link points:		(u) 445 mm (17.5 in)
Horizontal distance between the two lift arm end points:		(v) 560 mm (22.0 in)
Length of upper link:		(S) 660 mm (26.0 in)
Distance of upper link pivot point from rear wheel centre line	horizontally:	(c) 288 mm (11.3 in)
	vertically:	(d) 278 mm (10.9 in)
Distance of lower link pivot point from rear wheel centre	horizontally:	(e) 83 mm (3.3 in)
	vertically:	(f) 138 mm (5.4 in)
Distance of lower link pivot points to lift rod pivot points on lower link:		(D) 400 mm (15.7 in)
Length of lift rods:		(L) 540 mm (21.3 in)
Height of lower hitch points relative to the rear wheel centre line, situated 695 mm above the ground level		
- in low position:		(h) 488 mm (19.2 in)
- in high position:		(H) 184 mm (7.2 in)
Height of lower hitch points when locked in transport position:		Any height within lift range

SWINGING DRAWBAR

Height above ground, maximum:	680 mm (26.8 in)
minimum:	464 mm (18.3 in)
Tyre sizes, Front, Rear	7.50-16, 16.9-30
Type of adjustment:	Inverting drawbar
Distance of hitch point from rear axle centre:	665 mm and 620 mm (26.2 and 24.4 in) to rear
Distance of hitch point from power take-off shaft ends:	
vertically:	25 and 241 mm (1.0 and 9.5 in)
horizontally:	405 and 360 mm (15.9 and 14.2 in) to rear
Lateral adjustment:	320 and 160 mm (12.6 and 6.3 in)
Distance of pivot point from rear axles horizontally:	185 mm (7.3 in) to rear
Diameter drawbar pin hole:	32 mm (1.3 in)

LINKAGE DRAWBAR

Height above ground, maximum:	881 mm (34.7 in)
minimum:	200 mm (7.9 in)
Tyre sizes, Front, Rear	7.50-16, 16.9-30
Horizontal distance to power take-off shaft end:	680 mm (26.8 in), to rear
Number of holes:	7
Distance between holes:	82 mm (3.2 in)
Hole diameter:	32 mm (1.3 in)
Thickness and width of drawbar:	70 mm x 90 mm (2.8 x 3.5 in) overall with 32 mm (1.3 in) full width lateral slot

TRAILER HITCH

Height above ground, maximum:	920 mm (36.2 in)
minimum:	720 mm (28.3 in)
Tyre sizes, Front, Rear	7.50-16, 16.9-30
Distance of hitch point from rear axle centre:	630 mm (24.8 in) to rear
Distance of hitch point from power take-off shaft end:	
vertically above maximum:	215 mm (8.5 in)
minimum:	15 mm (0.6 in)
horizontally:	370 mm (14.6 in) to rear
Maximum vertical permissible load:	10.0 kN (2248 lb)
Diameter of pin hole:	32 mm (1.3 in)

FRONT TOWING HITCH

Vertical height at centre of clevis:	622 mm (24.5 in)
Tyre sizes, Front, Rear	7.50-16, 16.9-30
Width of clevis:	60 mm (2.4 in)
Diameter of pin hole:	32 mm (1.3 in)

STEERING

Method of operation:	Mechanical linkage power assisted with single, double acting ram, oil supplied from gear pump driven from timing gears
Make:	N.S.K. Japan; Technometra Czechoslovakia
Model:	11/148
Type:	225/250-1
Working pressure:	8.0 MPa (1160 lb/in^2)
Oil capacity:	4.4 l (7.7 UK pt)
Oil change period:	1200 hours
Make and model of filter:	Jihostroj Velesin, Czechoslovakia; H23
Filter(s) change period:	1200 hours
Recommended oil:	See "Fuels and lubricants used in test"

BRAKES

Service brake

Make:	Zetor
Model:	7211 2600
Type:	Dry disc, multiplate, 2 discs each side
Method of operation: or independent	Hydraulically by pedals, coupled or independent

Parking brake

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

Trailer brakes	Air brake operated by tractor pedals

STEERING WHEELS

Number:	2
Location:	At front of tractor
Tyres:	Barum
Size:	7.50 - 16
Ply rating:	6
Type of casing:	Cross ply
Maximum permissible load on each tyre:	745 kg (1642 lb)
Corresponding inflation pressure:	280 kPa (41 lb/in^2)
Track widths:	1440 - 1740 mm (57 - 69 in) by 75 mm (3.0 in) steps
Method of adjustment:	By extending axle

DRIVING WHEELS

Number:	2
Location:	At rear of tractor
Rear tyres:	Barum
Size:	16.9-30
Ply rating:	8
Type of casing:	Cross ply
Maximum permissible load on each tyre:	2245 kg (4950 lb)
Corresponding inflation pressure:	170 kPa (25 lb/in^2)
Track widths:	1425 - 1800 mm (56 - 71in) by 75 mm (3.0 in) steps
Method of adjustment:	Reversing wheels and off-set lug rims

WHEELBASE 2257 mm (88.9 in)

PROTECTIVE STRUCTURE SPECIFICATIONS

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

Description

The cabin 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:	Zetor 5911 5400
Type of suspension:	Parallelogram linkage adjustable for drivers weight
Type of damping:	Hydraulic
Range of adjustment, longitudinal:	150 mm (5.9 in)
vertical:	60 mm (2.4 in)

MISCELLANEOUS

Passenger's seat:	Mars
Location:	On left-hand side of driver
Number of places:	One

LIGHTING

Tyre sizes:

Front:	7.50-16
Rear:	16.9-30

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 1425 mm (56.1 in) track width, mm (in)
Headlights,	1040 (40.9)	135 (5.3) dia	797 (31.4)
Sidelights,	1445 (56.9)	65 x 60 (2.6 x 2.4)	275 (10.8)
Rear lights,	1504 (59.2)	105 x 75 (4.1 x 3.0)	209 (8.2)
Reflectors,	1377 (54.2)	80 (3.1) dia	82 (3.2)

CONDITIONS DURING TEST

Overall dimensions

(front: 7.50-16 rear: 16.9-30 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	3.80 (150)	1.84 (73)	2.23 (88)	2.37 (93)	2.58 (101)
Without ballast	3.77 (148)	1.84 (73)	2.23 (88)	2.39 (94)	2.60 (102)

Ground clearance

Clearance: 490 mm (19.3 in) limited by front axle

Track setting

Front: 1440 mm (56.7 in)

Rear: 1425 mm (56.1 in)

Tractor mass and ballasting

Tractor mass

(without driver but with tanks full - with cab)

		Front	Rear	Total
Without ballast	kg (lb)	1036 (2284)	2067 (4557)	3103 (6841)
With ballast	kg (lb)	1197 (2639)	2923 (6444)	4120 (9083)

Ballast

	Weights		Water, kg (lb)
	Number	Total mass, kg (lb)	
Front	Nil	Nil	Nil
Rear	8	293 (646)	576 (1270)
Additional	6	148 (326)	Front frame and weights

Fuel and lubricants used in tests

Fuel

Type:	Diesel oil to Class D British Standard 2869 : 1970 specific gravity at 15°C : 0.865, Cetane No. 47

Oils	Recommended	Used during test
Engine oil		
Type:	S.A.E. 20W/30	
Viscosity:	52 cSt at 50°C (122°F)	As recommended
Classification:	M.I.L. - 2104A	
Transmission oils		
Type:	S.A.E. 80W	
Viscosity:	45 cSt at 50°C (122°F)	As recommended
Classification:	M.I.L. - 2105A	
Final drives		
Type:	S.A.E. 80W	
Viscosity	45 cSt at 50°C (122°F)	As recommended
Classification:	M.I.L. - 2105A	
Hydraulic fluid		
Type:	S.A.E. 80W	
Viscosity:	45 cSt at 50°C (122°F)	As recommended
Classification::	M.I.L. - 2105A	
Steering oil		
Type:	HLP	
Viscosity:	18-23 cSt at 50°C (122°F)	As recommended
Classification:	DIN 51525	
Recommended grease:	Mobilgrease MP	As recommended
Number of lubrication points:	20	

II TEST RESULTS

A COMPULSORY TESTS

1. MAIN POWER TAKE-OFF PERFORMANCE

Date and location of tests: 17th September 1985, NIAE, Silsoe, Bedford, UK.

Type of dynamometer: Waterbrake, Heenan & Froude

Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly,		Specific,	Specific energy,
	Engine	P.t.o.	l/h (UKgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	kWh/l (hph/UKgal)
MAXIMUM POWER - 2 HOUR TEST						
49.0 (65.7)	2200	596	13.76 (3.02)	11.91 (26.26)	0.243 (0.399)	3.57 (21.05)
POWER AT RATED ENGINE SPEED						
49.0 (65.7)	2200	596	13.76 (3.02)	11.91 (26.26)	0.243 (0.399)	3.57 (21.05)
POWER AT STANDARD POWER TAKE-OFF SPEED						
46.9 (62.9)	1994	540	12.82 (2.82)	11.09 (24.45)	0.236 (0.388)	3.66 (21.58)
PART LOADS						
(i) The torque corresponding to maximum power at rated engine speed						
49.0 (65.7)	2200	596	13.76 (3.02)	11.91 (26.26)	0.243 (0.399)	3.57 (21.05)
(ii) 85% of the torque obtained in (i)						
42.9 (57.5)	2274	616	12.19 (2.67)	10.54 (23.24)	0.246 (0.404)	3.52 (20.82)
(iii) 75% of the torque defined in (ii)						
33.0 (44.2)	2319	628	10.11 (2.22)	8.75 (19.29)	0.265 (0.436)	3.26 (19.28)
(iv) 50% of the torque defined in (ii)						
22.1 (29.6)	2348	636	8.00 (1.75)	6.93 (15.28)	0.314 (0.561)	2.76 (16.32)
(v) 25% of the torque defined in (ii)						
11.3 (15.1)	2389	647	5.93 (1.30)	5.13 (11.31)	0.455 (0.748)	1.90 (11.25)
(vi) Unloaded						
0	2400	650	4.07 (0.89)	3.52 (7.76)	-	-

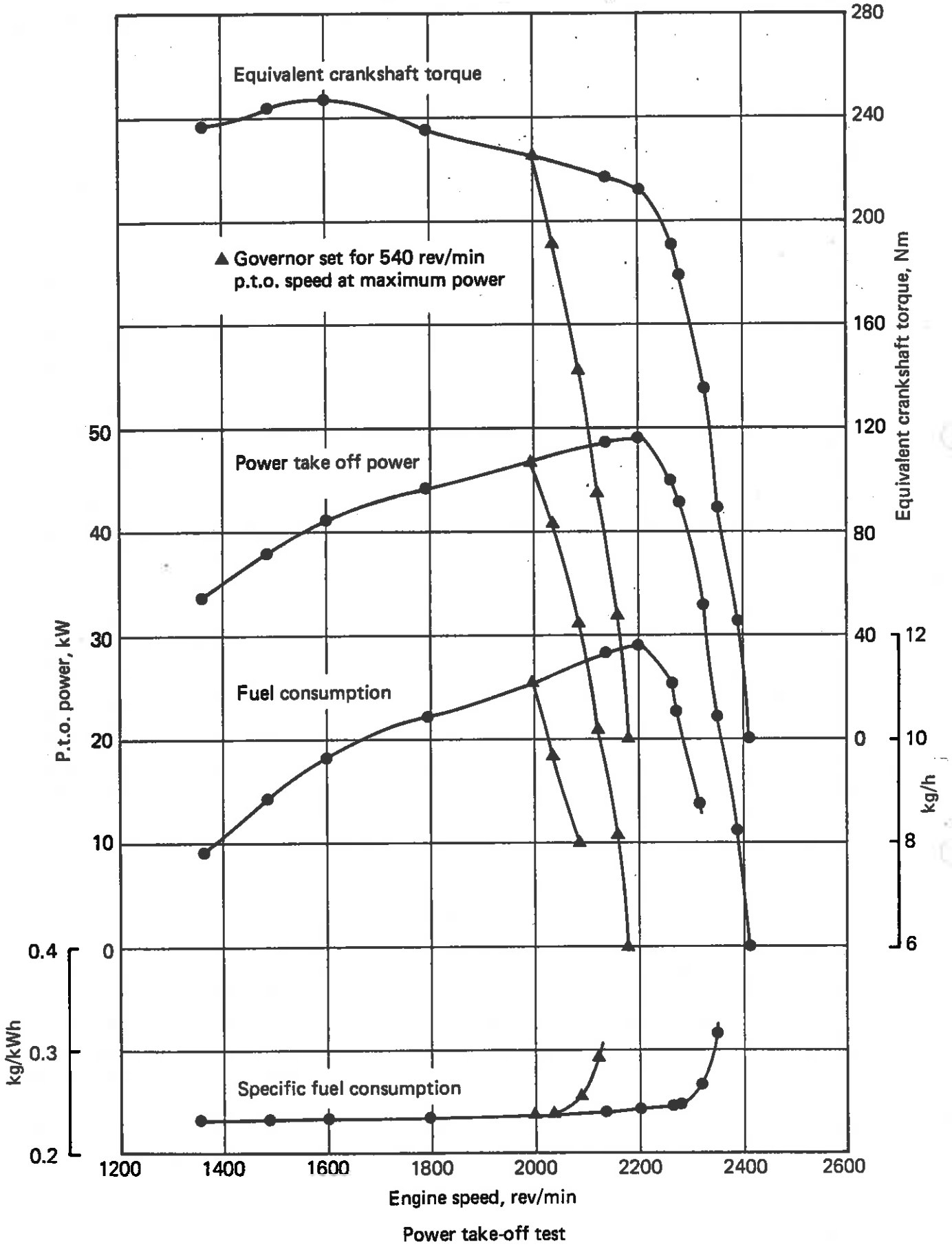
Part loads, the governor hand lever in the position corresponding to the standard p.t.o. speed at full load (540 rev/min).

Power, kW (hp)	Speed, rev/min		Fuel consumption, Hourly,		Specific,	Specific energy,
	Engine	P.t.o.	l/h (UKgal/h)	kg/h (lb/h)	kg/kWh (lb/hph)	kWh/l (hph/UKgal)
(i) The torque corresponding to maximum power at standard p.t.o. speed						
46.9 (62.9)	1994	540	12.82 (2.82)	11.09 (24.45)	0.236 (0.388)	3.66 (21.58)
(ii) 85% of the torque obtained in (i)						
40.7 (54.6)	2031	550	11.14 (2.45)	9.65 (21.27)	0.237 (0.390)	3.65 (21.58)
(iii) 75% of the torque defined in (ii)						
31.3 (23.3)	2086	565	9.24 (2.03)	8.00 (17.64)	0.255 (0.419)	3.39 (20.04)
(iv) 50% of the torque defined in (ii)						
21.0 (28.2)	2119	574	7.10 (1.56)	6.15 (13.56)	0.292 (0.480)	2.95 (17.53)
(v) 25% of the torque defined in (ii)						
10.8 (14.5)	2160	585	5.17 (1.13)	4.48 (9.74)	0.415 (0.682)	2.08 (12.35)
(vi) Unloaded						
0	2178	590	3.46 (0.76)	3.00 (6.61)	-	-

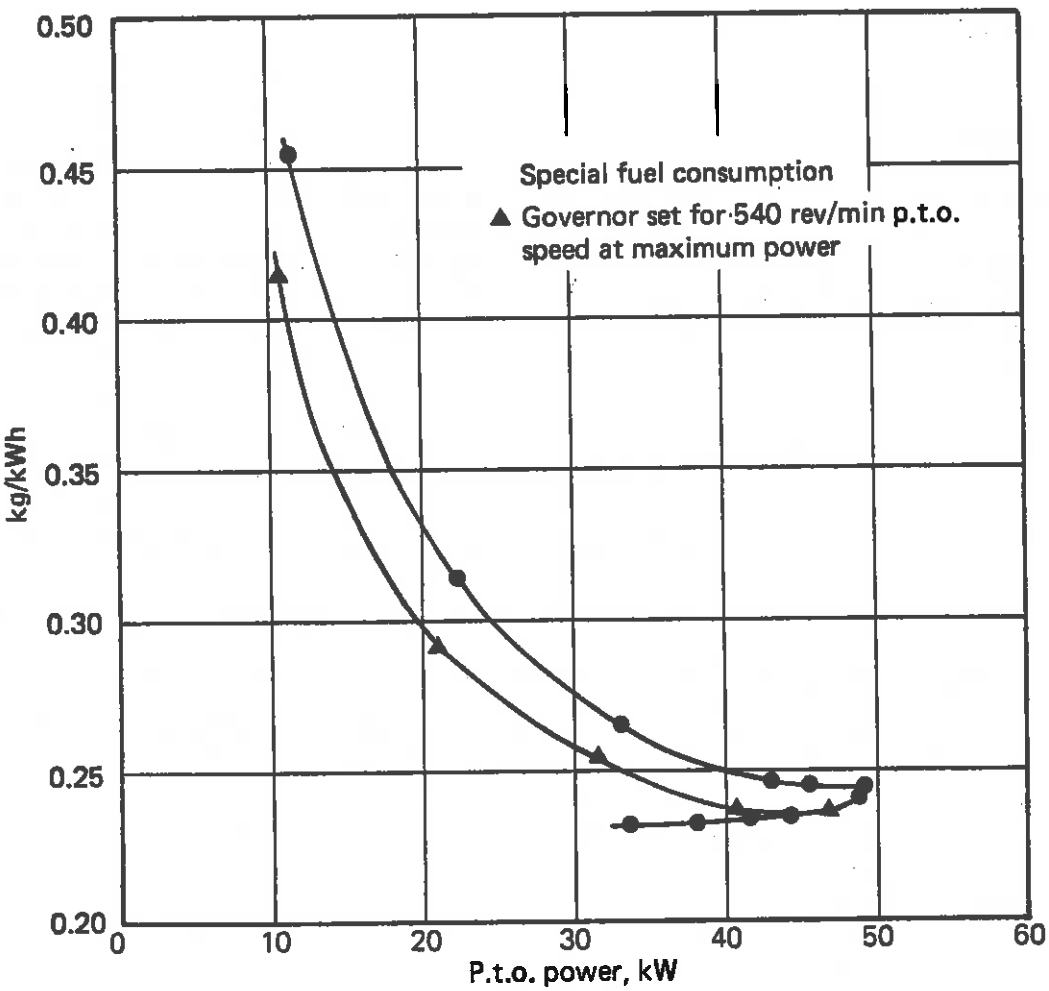
Standard specific fuel consumption, kg/kWh (lb/hph)

a) 0.246 (0.404) c) 0.237 (0.390)
b) 0.314 (0.561) d) 0.292 (0.480)

No load, maximum engine speed		2400 rev/min
Equivalent crankshaft torque at maximum power		212.6 Nm (156.8 lb ft)
Maximum equivalent crankshaft torque		246.8 Nm (182.0 lb ft) at 1600 rev/min engine speed
Mean atmospheric conditions	temperature	24°C (75°F)
	pressure	1018 m bar (30.06 in Hg)
	relative humidity	70%
Maximum temperature	coolant	78°C (172°F)
	engine oil	104°C (219°F)
	fuel	56°C (133°F)
	air intake	25°C (77°F)



Power take-off test



Power take-off test

2. LIFTING FORCE AND HYDRAULIC POWER

Date of tests: 7th October 1985

Hydraulic fluid

Make and type:) See "Fuels and lubricants used in test"
Viscosity:)

Type of hydraulic system: Closed centre

Hydraulic fluid temperature at beginning of test: 60°C

Power lift test

	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 (lbft)	Maximum tilt angle of mast over range of lift, degrees
At the hitch point	200 (5.1)	672 (26.4)	21.8 (4900)	14.0 (2030)	20.6 (15194)	-
On the frame	200 (5.1)	800 (31.5)	16.2 (3640)	14.0 (2030)	25.2 (18587)	11.5

Main linkage dimensions - see drawings and table on pages 8 and 9

Lifting heights relative to the horizontal plane including the lower link pivot points

mm	-380	-280	-220	-100	0	+100	+180	+280	+380
in	15.0	11.0	8.7	2.5	0	2.5	7.1	11.0	15.0
Lifting forces at hitch points (corresponding pressure 14.0 MPa 2030 lb/in^2)									
kN	-	28.4	26.3	25.0	24.0	23.5	22.8	21.8	-
lb	-	6390	5910	5620	5400	5280	5130	4900	-
Lifting forces at test frame (corresponding pressure 14.0 MPa 2030 lb/in^2									
kN	26.3	24.2	23.4	21.6	20.2	19.1	18.2	16.9	16.2
lb	5910	5440	5260	4860	4540	4290	4090	3800	3640

Hydraulic power test

Sustained pressure with relief valve open 17.2 MPa (2500 lb/in^2)

Pump delivery rate at minimum pressure 36.9 l/min (8.1 UK gal/min)

Flow rate corresponding to a hydraulic pressure equivalent to 90° per cent of the actual relief valve pressure setting and corresponding hydraulic power

Flow rate	29.3 l/min	(6.4 UK gal/min)
Pressure	15.5 MPa	(2250 lb/in^2)
Power	7.6 kW	(10.2 h.p.)

Flow rate and hydraulic pressure corresponding to maximum hydraulic power

Flow rate	35.9 l/min	(7.9 UK gal/min)
Pressure	14.0 MPa	(2030 lb/in^2)
Power	8.4 kW	(11.3 hp)

Tapping point used for test: Auxiliary service connection

Temperature of hydraulic fluid, if different from 65° ±5°C: Not applicable

Opening pressure of the unloading valve: Not applicable

Closing pressure of the unloading valve: Not applicable

3 DRAWBAR PERFORMANCE

Date of tests: 4th and 11th October 1985
Type of track: Concrete
Tyre sizes: Front, Rear 7.5-16 16.9-30

Height of drawbar above ground: Unballasted: 445 mm (17.5 in)
Ballasted: 420 mm (16.5 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 (unballasted) Tyre inflation pressure: front 200 kPa (29 lb/in²), rear 110 kPa (16 lb/in²)													
L5M	4.32 (2.68)	*28.2 (37.8)	23.5 (5280)	2290	15.0	-	-	48 (119)	77 (171)	92 (198)	14 (58)	62	999 (29.51)
H1M	5.10 (3.17)	*33.3 (44.7)	23.5 (5280)	2262	15.0	-	-	49 (120)	77 (171)	93 (199)	14 (58)	64	999 (29.51)
L5	5.59 (3.47)	*36.5 (48.9)	23.5 (5280)	2230	15.0	-	-	45 (114)	77 (171)	83 (183)	15 (59)	58	996 (29.44)
H2M	6.72 (4.17)	40.7 (54.6)	21.8 (4900)	2198	11.5	-	-	47 (117)	79 (174)	89 (192)	15 (60)	52	995 (29.38)
H1	6.76 (4.20)	40.8 (54.7)	21.7 (4870)	2197	11.4	-	-	48 (119)	79 (174)	92 (199)	15 (60)	52	995 (29.38)
H2	9.21 (5.72)	41.2 (55.2)	16.1 (3610)	2198	8.0	-	-	48 (119)	78 (173)	91 (197)	15 (60)	58	997 (29.45)
H3M	9.89 (6.14)	41.1 (55.1)	15.0 (3360)	2202	7.4	-	-	44 (111)	79 (174)	83 (183)	15 (60)	53	995 (29.38)
H3	13.26 (8.24)	39.8 (53.3)	10.8 (2430)	2199	5.0	-	-	49 (120)	79 (174)	93 (201)	15 (59)	57	996 (29.44)
(ii) MAXIMUM POWER (ballasted) Tyre inflation pressure: front 200 kPa (29 lb/in²), rear 110 kPa (16 lb/in²)													
L1M	1.25 (0.78)	*10.4 (13.9)	30.0 (6740)	2360	15.0	0.548 (0.901)	1.57 (9.6)	49 (121)	75 (167)	89 (193)	10 (51)	68	1004 (29.67)
L2M	1.58 (0.98)	*13.2 (17.7)	30.0 (6740)	2350	15.0	0.485 (0.798)	1.78 (10.9)	45 (113)	75 (168)	90 (194)	11 (52)	67	1004 (29.67)
L1	1.62 (1.01)	*13.5 (18.1)	30.0 (6740)	2350	15.0	0.463 (0.762)	1.87 (11.4)	47 (117)	75 (168)	89 (193)	10 (51)	69	1004 (29.67)
L2	2.10 (1.30)	*17.5 (23.5)	30.0 (6740)	2334	15.0	0.415 (0.683)	2.08 (12.7)	46 (115)	75 (168)	89 (193)	10 (51)	69	1004 (29.67)
L3M	2.22 (1.38)	*18.5 (24.8)	30.0 (6740)	2325	15.0	0.402 (0.661)	2.15 (13.1)	50 (122)	75 (168)	89 (193)	10 (51)	71	1005 (29.69)
L3	2.88 (1.79)	*24.0 (32.2)	30.0 (6740)	2309	15.0	0.368 (0.605)	2.35 (14.3)	48 (119)	75 (167)	90 (194)	10 (51)	69	1004 (29.67)
L4M	3.10 (1.93)	*25.8 (34.6)	30.0 (6740)	2300	15.0	0.353 (0.581)	2.45 (14.9)	50 (122)	75 (167)	90 (195)	9 (49)	70	1005 (29.69)
L4	4.00 (2.49)	*33.3 (44.7)	30.0 (6740)	2258	15.0	0.341 (0.561)	2.54 (15.5)	47 (117)	75 (167)	92 (198)	10 (51)	70	1005 (29.69)
L5M	4.14 (2.57)	*34.5 (46.3)	30.0 (6740)	2225	15.0	0.339 (0.558)	2.55 (15.5)	47 (117)	76 (170)	89 (193)	11 (51)	63	1003 (29.63)
H1M	5.00 (3.11)	38.4 (51.5)	27.7 (6210)	2204	13.3	0.311 (0.511)	2.78 (17.0)	47 (117)	76 (170)	93 (199)	11 (52)	62	1003 (29.63)
L5	5.51 (3.42)	39.5 (52.9)	25.8 (5790)	2200	12.0	0.307 (0.505)	2.82 (17.2)	47 (117)	76 (170)	95 (204)	11 (52)	60	1002 (29.61)
H2M	6.76 (4.20)	40.6 (54.5)	21.6 (4800)	2199	10.0	0.297 (0.489)	2.91 (17.7)	53 (128)	78 (174)	97 (207)	13 (56)	57	1002 (29.61)
H1	6.81 (4.23)	40.6 (54.5)	21.5 (4830)	2202	10.0	0.301 (0.495)	2.88 (17.5)	49 (121)	78 (174)	97 (207)	12 (53)	61	1003 (29.63)
H2	9.04 (5.62)	41.3 (55.4)	16.5 (3700)	2200	8.1	0.292 (0.480)	2.97 (18.1)	52 (126)	78 (174)	97 (207)	12 (53)	58	1002 (29.61)
H3M	9.71 (6.03)	40.7 (54.6)	15.1 (3390)	2203	7.6	0.300 (0.493)	2.89 (17.6)	51 (124)	78 (174)	96 (206)	12 (54)	57	1001 (29.58)
(iii) FIVE HOUR TEST AT 75% OF PULL AT MAXIMUM POWER													
H1	7.33 (4.55)	32.8 (44.0)	16.1 (3610)	2277	8.0	0.303 (0.498)	2.85 (17.4)	47 (117)	76 (170)	95 (204)	12 (54)	71	1012 (29.90)
(iv) +FIVE HOUR TEST AT PULL CORRESPONDING TO 15% WHEELSLIP IN TEST (ii)													
L4	4.14 (2.57)	34.5 (46.3)	30.0 (6740)	2250	-	-	-	47 (117)	76 (170)	98 (209)	13 (56)	77	1019 (30.10)

Total oil consumption during ten hours duration of tests (iii) and (iv) 59.1 g/h (0.130 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.

4. TURNING SPACE AND TURNING CIRCLE

Details of wheel equipment: As in specification without ballast.

Track of wheels: front - 1440 mm (56.7 in)

rear - 1425 mm (56.1 in)

	With brakes		Without brakes	
	Left-hand	Right-hand	Left-hand	Right-hand
Radius of turning space, m (in)	3.51 (138)	3.27 (129)	3.92 (154)	3.57 (141)
Radius of turning circle, m (in)	3.34 (131)	3.10 (122)	3.75 (148)	3.40 (134)

5. LOCATION OF CENTRE OF GRAVITY

Height above ground, mm (in)	961 (37.8)
Distance forward from the vertical plane containing the axis of the rear wheels, mm (in)	743 (29.3)
Distance from the median plane of the tractor, mm (in)	0

6. BRAKING

Date of tests: 17th October 1985

Type of track: Concrete

	Front, kg	(lb)	Rear, kg	(lb)	Total, kg	(lb)
Ballasted	2029	(4473)	3571	(7873)	5600	(1246)
Unballasted	1036	(2284)	2067	(4557)	3103	(6841)

Tyres: - front 7.5 - 20

- rear 16.9 - 34

Type 0 Service brakes (cold)

Travelling speed before application of brakes, 32.1 km/h (20.0 mile/h)

Ballasted	Force on brake pedal	N (lb)	100 (22)	200 (45)	300 (67)	400 (90)	500 (112)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	0.9 (2.9)	1.7 (5.5)	2.4 (7.8)	3.1 (10.1)	3.7 (12.0)	3.7 (12.0)
Unballasted	Force on brake pedal	N (lb)	100 (22)	200 (45)	300 (67)	400 (90)	500 (112)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	0.4 (1.3)	1.5 (4.9)	2.7 (8.8)	3.2 (10.4)	3.2 (10.4)	3.2 (10.4)

Type 1 Service brakes (hot)

Ballasted	Force on brake pedal	N (lb)	100 (22)	200 (45)	300 (67)	400 (90)	500 (112)	600 (135)
	Mean deceleration	m/s^2 (ft/s^2)	0.4 (1.3)	1.3 (4.2)	2.2 (7.2)	3.2 (10.4)	3.5 (11.4)	3.5 (11.4)

Brakes were heated by: Driving

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)	224 (69)	189 (58)	224 (69)	189 (58)

7. MEASUREMENT OF EXTERNAL NOISE LEVEL

Date of tests:	1st October 1985
Type of sound level meter:	Bruel and Kjaer 2209
Type of track:	Concrete
Tyres fitted:	Front 7.5 - 20 Rear 16.9 - 34
Results of test	
Gear:	H5
Travelling speed before acceleration:	24.1 km/h (15.0 mile/h)
Sound level:	92 dBA

8. NOISE MEASUREMENT AT THE DRIVER'S EAR

Date of tests:	30th September 1985
Type of sound level meter:	Bruel and Kjaer 2209
Type of track:	Concrete
Tyres fitted:	Front 7.5 - 20 Rear 16.9 - 34
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
*L5	16.0 (3600)	5.7 (3.5)	84
*L5	Light load	7.9 (4.9)	82
H5	Light load	32.7 (20.3)	82

*The L5 gear corresponds to the nominal travelling speed nearest to 7.5 km/h (4.7 mile/h)

REPAIRS AND ADJUSTMENTS DURING TESTS: None

REMARKS: None

Test carried out by: F. Thistlethwaite

Officer in charge: P.C. Seward

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

R.M. Stayner for the Director

Date: 22nd November 1985.