SILSOE RESEARCH INSTITUTE
Wrest Park, Silsoe,
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Report on test in accordance with the OECD STANDARD CODE II (RESTRICTED CODE) for the Official Testing of Agricultural and Forestry Tractors

Massey Ferguson 243 Four-Wheel Drive Tractor with 8-speed Transmission and Emissions Compliant Engine (40 Km/h)



Manufactured by: AGCO Limited
P O Box 62
Banner Lane
Coventry
West Midlands CV4 9GF
England

Submitted for test by: The manufacturer

Report No: 808

Date: August 1999

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OECD/7862/0199

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Tractor manufacturer's name and address:	AGCO Limited, P O Box 62 Banner Lane, Coventry, West Midlands, CV4 9GF
Location of tractor assembly:	Coventry, England
Submitted for test by:	The manufacturer
Selected for test by:	The manufacturer with the agreement of the testing station
Place of running in:	Coventry
Duration of running in:	70 hours
Location of test:	Silsoe Research Institute Wrest Park, Silsoe, England

1. SPECIFICATIONS OF TRACTOR

1.1 Identification

Make:	Massey Ferguson
Model:	MF 243 with 8-speed Transmission and emissions compliant engine (40 Km/h)
Type:	Four wheel drive, unit construction
Serial No:	G18382
1st Serial No:	G18382

1.2 Engine

Make:	Perkins
Model:	903.27
Type:	3 stroke, direct injection, naturally aspirated diesel
Serial No:	U327722D
Ist serial No:	U327722D

1.2.1 Cylinders

Number/disposition:	3 vertical In-line
Bore/stroke:	95 mm/127 mm
Capacity:	2701 cm^3
Compression ratio:	17.25:1
Arrangement of valves:	Overhead
Cylinder liners:	Dry

1.2.2 Supercharging

Make:	None
Model:	---
Type:	---
Pressure:	---

1.2.3 Fuel system

Fuel feed system:	Hand primed pump, mechanically driven from camshaft
Make, type and model of fuel filter:	Lucas filter with transparent sediment bowl
Capacity of fuel tank:	48 litres
Make, type and model of injection pump:	Lucas DP 202 distributor type 1235
Serial No:	49439 CRG
Manufacturer's production setting of injection pump:	10.76 to 11.43 l/h
Flow rate:	54.8+/- 3% mm^3/stroke at 2250 rev/min engine speed at full load on 45°C pump inlet temperature
Timing:	1 degree BTDC at 1350 rev/min Dynamic timing
Make, type and model of injectors:	Lucas CAV, code KL Complete injector Nozzle Perkins :- 2645A049 2645A633 Lucas :- LDSL058PBA
Injection pressure:	29.8 MPa

1.2.4 Governor

Make:	CAV
Model:	Not applicable
Type:	Mechanical, incorporated in injection pump
Governed range of engine speed:	750 to 2428 rev/min
Rated engine speed:	2250 rev/min

1.2.5 Air cleaner

Pre-cleaner	None
Main cleaner Make: Type:	Donaldson 2 stage dry element with warning light removable main and safety element
Model:	None
Location of air intake:	Under bonnet - right hand side
Maintenance indicator:	Warning light on instrument panel

1.2.6 Lubrication system

Type of feed pump:	Forced feed from rotor type pump
Type of filter:	Full flow, replaceable canister
Number:	1

1.2.7 Cooling system

Type of coolant:	Water or water and antifreeze solution
Type of pump:	Centrifugal
Specification of fan:	Belt driven pulley
Number of fan blades:	4
Fan diameter:	394 mm
Coolant capacity:	10.7 litres
Type of temperature control:	Thermostat
System pressure:	75 kPa

1.2.8 Starting system

Make:	Magneti Marelli
Model:	M127
Type:	Electrical, pre-engaged, solenoid operated
Starter motor power rating:	2.8 kW
Cold starting aid:	CAV, SINTEROM or ISKRA induction heater
Safety device:	Starting operable only when high/low and PTO levers are in neutral

1.2.9 Electrical system

Voltage:	12
Generator:	Alternator
Make:	Magneti Marrelli
Model:	A 127-70
Type:	Belt driven
Power:	0.84 kW
Batteries:	1 Fulmen,type 372 lead acid, maintenance free
Rating:	IEC 505 amp. Equivalent to 105 AH at 20 hour rating

1.2.10 Exhaust system

Make:	Nelson Burgess
Model:	None
Type:	Vertical silencer
Location:	Left hand side of bonnet
Height of outlet above ground:	2381 mm

1.3 Transmission

1.3.1 Clutch (Travel and Power Take-Off)

Make:	LUK
Model:	None
Type:	Dual or split torque, Dry
Number of plates:	2 for dual, 1 for split torque
Diameter of plates:	305 mm, main clutch 254 mm, PTO clutch (Dual clutch)
Method of operation:	Mechanical by pedal

1.3.2 Gear box

Make:	Massey Ferguson
Model:	None
Description:	Mechanical manual operation, 4 forward and 1 reverse speeds with high and low range selector.

	Forward	Reverse
Number of gears	4	1
Number of ranges/groups	2	2
Total of arrangements	8	2

Available options: 8 x 8

1.3.3 Rear axle and final drives

Make:	Own make
Model:	None
Type:	Crown wheel and pinion with differential and outboard epicyclic reduction gear final drives
Differential lock:	
Type:	Mechanical dog clutch on differential gears
Method of engagement:	Push lever down
Method of disengagement:	Pull lever up

1.3.4 Front axle and final drives

Make:	Dana Spicer Europe
Model:	AG 65 side drive
Type:	Crown wheel and pinion with differential and outboard epicyclic reduction gear final drives
Differential lock:	
Type:	None
Method of engagement:	---
Method of disengagement:	---

1.3.5 Total ratios and travelling speeds

Gear	Group No	Number of engine revolutions for one revolution of the driving wheels	Nominal travelling speed at rated engine speed:* 2250 rev/min km/h
Forward			
1	1L	210.380	2.58
2	2L	143.458	3.78
3	3L	78.256	6.94
4	4L	63.767	8.51
5	1H	51.426	10.56
6	2H	35.067	15.48
7	3H	19.129	28.38
8	4H	15.587	34.83
Reverse			
1	L	154.504	3.52
2	H	37.768	14.37

Range selection: L = low H =High

(*) Calculated with a tyre dynamic radius index of 640 mm (ISO 4251/1-1992)

Number of revolutions of front wheels for one revolution of rear wheels: 1.3669

1.4 Power take-off

1.4.1 Main power take-off

Type:	Independent - single speed
Method of engagement:	By hand lever, hydraulically engaging wet multi
Number of shafts:	1, (6 to ISO 500/1991)
Method of changing power take-off speeds:	Not applicable
Clutch	
Make:	Own make
Model:	None
Type:	Hydraulically actuated wet multiplate
Number of plates:	5
Diameter of plates:	128 mm

Optional Main power take-off

Type:	Live - Single speed
Method of engagement:	By depressing the clutch pedal fully and moving the lever situated on the side cover
Number of shafts:	1,(6 to ISO 500/1991)
Method of changing power take-off speeds:	Not applicable

1.4.1.1 Power take-off proportional to engine speed

540 rev/min

Location:	Rear of tractor
Diameter of power take-off shaft:	34.9 mm
Number of splines:	6 to ISO 500/1991
Height above ground:	500 mm
Distance from the median plane of the tractor:	Central
Distance behind rear wheel axis:	333 mm
Pto speed at rated engine speed:	679 rev/min
Engine speed at standard power take-off speed:	1789 rev/min
Ratio of rotation speeds:	3.3125:1
Power restriction and maximum torque:	None
Direction of rotation (viewed from behind tractor):	Clockwise

1.5 Hydraulic power lift (as fitted to the test tractor)

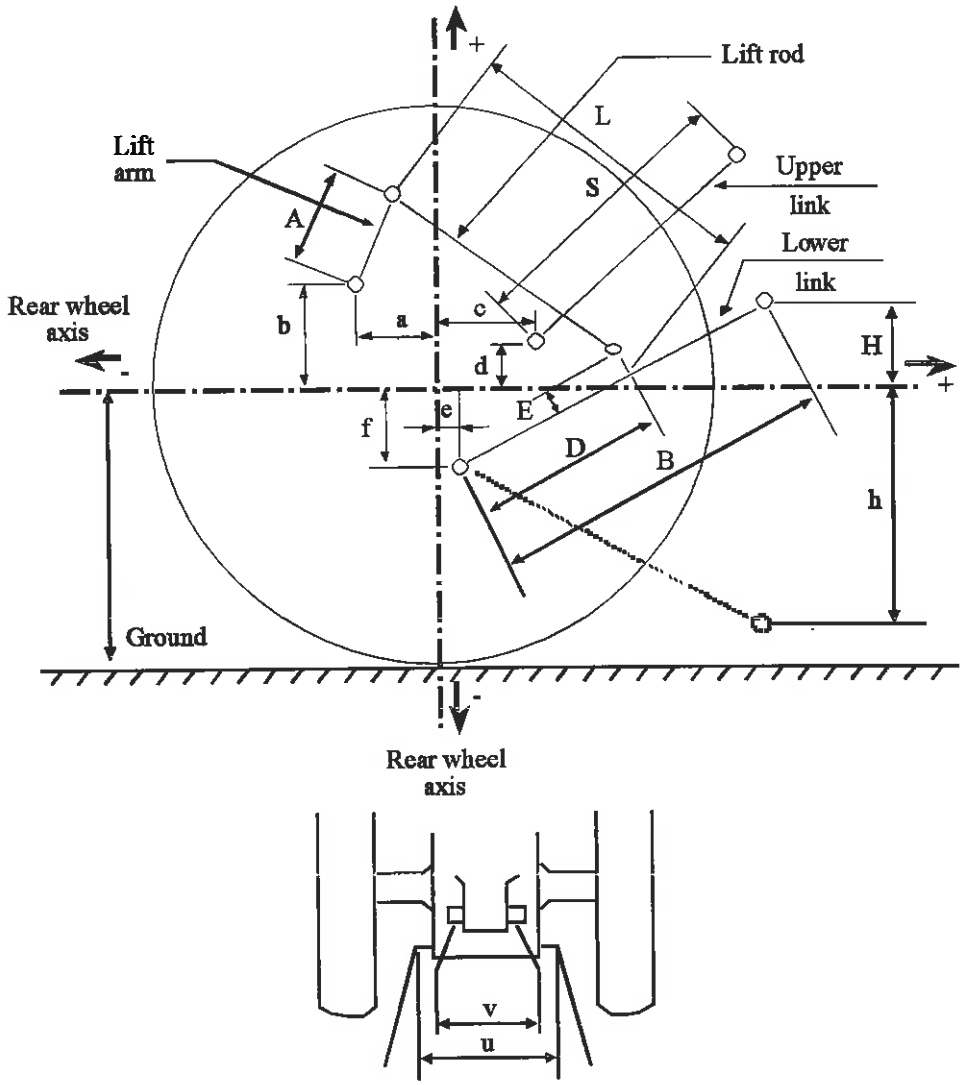
Make:	Massey Ferguson
Model:	None
Type:	Hydraulic, with inlet suction control closed system
Type and number of cylinders:	1 single acting, internal
Type of linkage lock for transport:	Hydraulic
Relief valve pressure setting:	20.4 MPa
Opening pressure of cylinder safety valve:	None
Lift pump type:	4 cylinder, piston
Transmission between pump and engine:	Driven from PTO shaft independent of main clutch
Type and number of filters:	Full flow with metal mesh strainer, 1
Site of oil reservoir:	Transmission housing
Type, number and location of tapping points:	Optional tapping port (not fitted to test tractor), a valve allows flow to spool valve and quick release couplings
Maximum volume of oil available to external cylinders:	Not applicable

1.5.2 Auxiliary hydraulic system

Make:	Sunstrand
Model:	SP 250
Type:	Gear
Relief valve pressure setting:	17.6 MPa
Opening pressure of cylinder safety valve:	None
Transmission between pump and engine:	Driven from PTO shaft independent of main clutch
Type and number of filters:	One off metal full flow strainer, and one off by-pass centrifugal filter
Site of oil reservoir:	Main transmission casing
Type, number and location of tapping points:	2 spool valves, each quick release coupling and separate return, to ISO 5675 Note: 2 further spool valves may be fitted if required. A valve allows combination with main system up to the auxiliary relief valve pressure
Maximum volume of oil available to external cylinders:	Not applicable

1.6 Three-point linkage

Category:	2 to ISO standard 730-1:1994
Category adaptor:	Category 1 interchangeable ball in lower link and interchangeable socket in top link
Controls:	Draught or position control with top link sensing



LIFT TEST
Linkage geometry

Fig 2.1

Table 2.1
Dimensions of linkage when attached to the standard frame (ISO 730-1-1994 CAT 2)

			Dimensions or range	Setting used in Test
Length of lift arms:		(A)	267 mm	267 mm
Length of lower links:		(B)	903 mm	903 mm
Distance of lift arm pivot point from rear wheel centre line:	horizontally: vertically:	(a) (b)	196 mm 233 mm	196 mm 233 mm
Horizontal distance between the two lower link points:		(u)	492 mm	492 mm
Horizontal distance between the two lift arm end points:		(v)	534 mm	534 mm
Length of upper link:		(S)	609 - 762 mm	686 mm
Distance of upper link pivot point from rear wheel centre line:	horizontally: vertically:	(c) (d)	186, 200, 216 mm 205, 171, 132 mm	186 mm 205 mm
Distance of lower link pivot point from rear wheel centre line:	horizontally: vertically:	(e) (f)	32 mm forward 212 mm	32 mm 212 mm
Distance of lower link points to lift rod pivot points on lower link centre line:	horizontally: vertically:	(D) (E)	428,488 mm on centre line	428 mm 0 mm
Length of lift rods:		(L)	574 - 623	610 mm
Height of lower hitch points (*) relative to the rear wheel centre line, situated 640 mm above the ground level:				
- in low position		(h)	470 - 335 mm	443 mm
- in high position		(H)	305 - 208 mm	222 mm
Height of lower hitch points when locked in transport position (*)			Any height within lift range (hydraulic transport lock)	

* Assuming r = tyre dynamic radius index of 640 mm ISO 4251/1-1992

1.7 Swinging drawbar

Type:	Clevis
Height above ground maximum:	470 mm
minimum:	275 mm
Type of adjustment:	Inverting drawbar and clevis
Distance of hitch point from rear-wheel axis, horizontally:	573 mm, 688 mm, 738 mm
Distance of hitch point from power take-off shaft ends:	
Vertically:	25 mm, 122 mm, 123 mm, 228 mm
Horizontally:	254 mm, 355 mm, 405 mm
Lateral adjustment (centre of clevis):	
Right-hand:	200 mm drawbar in, 237 mm, 252 mm, drawbar out
Left-hand:	200 mm drawbar in, 237 mm, 252 mm, drawbar out
Distance of pivot point from rear axles horizontally:	100 mm forward
Width of clevis:	65 mm
Diameter of drawbar pin hole:	33 mm
Maximum vertical permissible load:	11.6 kN

1.8 Trailer hitch

Type:	None fitted

1.9 Holed drawbar

Type:	None fitted

Front towing hitch

Type:	Clevis in front weight frame
Vertical height to centre of clevis:	540 mm
Width of clevis:	50 mm
Diameter of pin hole:	33 mm

1.10 Steering

Make:	Massey Ferguson
Model:	None
Type:	Hydrostatic
Method of operation:	
Pump:	Engine mounted gear pump with resevoir
Motor:	Danfoss OSPC-100-0N
Ram:	2 double acting operating both track rods
Filter:	None

1.11 Brakes

1.11.1 Service brake

Make:	Girling
Model:	None
Type:	Oil-immersed multiplate discs, 3 per side
Method of operation:	Independent or combined pedal, mechanical
Trailer braking take-off:	None

1.11.2 Parking brake

Type:	Mechanical via cable
Method of operation:	Hand lever with ratchet

1.12 Wheels

Number: 4

Front: 2 steering and driving

Rear: 2 driving

Wheelbase: 1930 mm

Track width adjustment:

	Minimum, mm	Maximum, mm	Adjustment method
Front	1118	1629	By reversing wheels and offset lug rims
Rear	1430	2130	By reversing wheels and offset lug rims

1.13 Protective structure (if fitted)

Make: GKN Sankey Agricultural Products

Model: 900

Type: 2 Post folding

Manufacturer's name and address: GKN Sankey, Hadley Castle (Cab-Works), P O Box 86, Telford TF1 4RE

Protective device: ROPS

Tiltable/Not tiltable: Tiltable

OECD approval

Approval number: 4/0561

Date of approval: 8 December 1998

Nos. minor modification certificates, if any: None

1.14 Seat

1.14.1 Driver,s seat

Make/Model/Type: Grammer / DS 44/ 1HB

Seat and steering wheel reversible: No

Type of suspension: Spring suspension

Type of damping: Mechanical

Range of adjustment:

Longitudinal: 150 mm

Vertical: 80 mm

Safety belt: Yes

1.15 Lighting

Unrestricted beam angle of headlight in plan view: 110°

	Height above ground to centre mm	Size mm	Distance from outside edge to median plane of tractor mm
Headlight	1055	160 x 100	220
Sidelights	---	---	---
Rear light	855	115 x 70	350
Axle reflectors	600	80 dia	233
Rear fender reflectors	---	---	---

2. TEST CONDITIONS

2.1 Overall dimensions

Length mm	Width		Height at top of	
	Minimum mm	Maximum mm	Protective structure mm	Exhaust pipe mm
3320	1820	2420	2362	2381

2.2 Ground clearance (unballasted tractor) 220 mm

Clearance-limiting part: Drawbar clevis in lowest position

2.3 Tractor mass (ROPS)

	Unballasted		Ballasted	
	Without driver kg	With driver kg	Without driver kg	With driver kg
Front	946	949	--	--
Rear	1381	1435	--	--
Total	2327	2402	--	--

2.5 Tyres and track width specification

	Front	Rear
Tyres dimensions ply rating type	320/70R20 6 Radial	14.9 x 28 6 Radial
Maximum load (tyre manufacturer's), kg	1150	1800
Maximum load (tractor manufacturer's), kg	630	1620
Inflation pressure (tyre manufacturer's),Bar	1.6	1.6
Dynamic radius index , mm	465	640
Chosen track width (manufacturer's nominal), mm	1605	1630

2.6 Fuel

Type: Diesel oil to Class D, 1.5 to 5.5 cST
Density at 15°C 0.8370 g/cm^3

2.7 Oils and lubrication

2.7.1 Capacity and change interval

	Capacity litre	Oil change hours	Filter change hours
Engine	7.25	250	250
Front axle differential	5.5	1000	None
Front axle hub (each)	0.8	1000	None
Gearbox	50	1000	1000
Rear axle Hydraulic system Final drives (rear) Steering	Integral with gearbox		
Brakes	--	Top-up	None

2.7.2 Specifications

	Recommended	Used during test
Engine oil		
Type:	SAE 15W/30, 15W/50 or 10W/40	SAE 15W/30
Viscosity:	54 cSt at 50°C	
Classification:	MIL-L-2104-2C, API. CD. Min	
Transmission oils		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MF 1139 or MF 1135	
Rear final drives		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MF 1139 or MF 1135	
Front differential and final drives		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MF 1139 or MF 1135	
Hydraulic brakes		
Type:	Mineral	As recommended
Viscosity:	7.2 cSt at 50°C	
Classification:	MF CMS 1151A	
Hydraulic fluid		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MF 1139 or MF 1135	
Steering oil		
Type:	SAE 15W/30	As recommended
Viscosity:	54 cSt at 50°C	
Classification:	MF 1139 or MF 1135	
2.7.3 Grease	Consistency 2 lithium	As recommended
Number of lubrication points:	19	

3. COMPULSORY TESTS RESULTS

3.1 Main power take-off (540)

Date and location of tests: 16 June 1999
Silsoe Research Institute,
Wrest Park, Silsoe, Bedford

Type of dynamometer: Eddy Current, Borghi and Saveri

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
3.1.1 MAXIMUM POWER - TWO HOUR TEST						
35.5	2250	679	9.29	11.10	261	3.20
3.1.2 POWER AT RATED ENGINE SPEED						
35.5	2250	679	9.29	11.10	261	3.20
3.1.3 STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
31.7	1789	540	7.58	9.05	239	3.50
3.1.4 PART LOADS 3.1.4.1 The torque corresponding to maximum power at rated engine speed						
35.5	2250	679	9.29	11.10	261	3.20
3.1.4.2 85% of the torque defined in 3.1.4.1						
31.1	2319	700	8.32	9.94	268	3.13
3.1.4.3 75% of the torque defined in 3.1.4.2						
23.8	2358	712	6.87	8.21	289	2.89
3.1.4.4 50% of the torque defined in 3.1.4.2						
16.1	2388	721	5.55	6.63	345	2.43
3.1.4.5 25% of the torque defined in 3.1.4.2						
8.1	2412	728	3.82	4.57	472	1.77
3.1.4.6 Unloaded						
0	2424	732	2.45	2.93	--	--

Power kW	Speed		Fuel consumption			Specific energy kWh/l
	Engine rev/min	P.T.O. rev/min	Hourly kg/h	Hourly l/h	Specific g/kWh	
3.1.5 PART LOADS AT STANDARD POWER TAKE-OFF SPEED (540 ± 10 rev/min)						
3.1.5.1 The torque corresponding to maximum power						
31.7	1789	540	7.58	9.05	239	3.50
3.1.5.2 85% of the torque obtained in 3.1.5.1						
28.4	1885	569	6.91	8.26	243	3.44
3.1.5.3 75% of the torque obtained in 3.1.5.2						
21.9	1935	584	5.58	6.67	255	3.28
3.1.5.4 50% of the torque obtained in 3.1.5.2						
14.9	1984	599	4.43	5.29	297	2.82
3.1.5.5 25% of the torque obtained in 3.1.5.2						
7.6	2014	608	3.03	3.62	398	2.10
3.1.5.6 Unloaded						
0	2040	616	1.79	2.14	--	--

No load, maximum engine speed:	2424 rev/min
Torque (equivalent crankshaft) at maximum power:	150.8 Nm
Torque (equivalent crankshaft) at rated speed:	150.8 Nm
Maximum torque (equivalent crankshaft): (engine speed 1248 rev/min)	180.3 Nm
Mean atmospheric conditions:	
• Temperature	25°C
• Pressure	102.0 kPa
• Relative humidity	40 %
Maximum temperatures:	
• Coolant	82°C
• Engine oil	104°C
• Fuel	52°C
• Engine air intake	27°C

3.2 Hydraulic power and lifting force

Date of tests: 8 July 1999

3.2.1 Hydraulic power test

Sustained pressure with relief valve open: 18.6 MPa

Pump delivery rate at minimum pressure: 45.0 l/m

	Flow rate l/min	Pressure MPa	Power kW
Flow rate corresponding to a hydraulic pressure equivalent to 90% of the actual relief valve pressure setting and corresponding hydraulic power	42.7	16.7	11.88
Flow rate and hydraulic pressure corresponding to maximum hydraulic power	42.5	17.2	12.18

Tapping point used for test: Auxiliary service

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

3.2.2 Power lift test - (To ISO 730-1:1990)

	At the hitch point	On the frame
Height of lower hitch points above ground in down position	197 mm	197 mm
Vertical movement	665 mm	905 mm
Maximum corrected force exerted through full range	10.6 kN	8.7 kN
Corresponding pressure of hydraulic fluid	16.7 MPa	16.7 MPa
Moment about rear-wheel axis	9.2 kNm	12.9 kNm
Maximum tilt angle of mast from vertical	--	21 degrees

Linkage settings for test - see Table 2.1 and Figure 2.1

Lifting heights relative to the horizontal plane including the lower link pivot points											
mm	-288	-231	-150	-80	0	100	200	300	434	500	617
Lifting forces (the values measured are corrected to correspond to a hydraulic pressure equivalent to 90% of the actual relief valve pressure delivered by the hydraulic system)											
at the hitch points kN	--	10.6	11.7	12.6	13.2	13.8	14.5	14.9	15.4	--	--
Corresponding pressure: 16.7 MPa											
at the frame kN	8.7	9.0	9.6	9.9	10.1	10.1	10.1	10.0	9.6	9.4	9.1
Corresponding pressure: 16.7 MPa											

3.3 Drawbar power test (unballasted tractor), 4 wheel drive

Date and Location of tests: 6 July 1989
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

Height of drawbar above ground	Tyre inflation pressure (kPa) Front	Rear
270 mm	83	76

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Spec Fuel cons	Spec energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Eng oil	Temp	Rel Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kwh	kWh/l	Deg C	Deg C	Deg C	Deg C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
1L	13.0	19.1	2.44	2385	15.0	451	1.85	50	78	97	23	50	100.8
2L	18.8	19.2	3.53	2353	15.0	376	2.23	50	78	98	22	50	100.8
3L	27.7	15.2	6.54	2245	11.0	335	2.50	55	81	95	25	44	100.9
4L	27.9	12.1	8.30	2252	8.0	329	2.55	56	82	97	25	50	100.9
1H	28.1	9.9	10.21	2244	6.5	326	2.56	56	79	100	25	46	100.9
2H	27.8	6.5	15.32	2245	4.3	331	2.53	54	80	100	25	45	100.8
3.3.2 FUEL CONSUMPTION 3.3.2.1 In selected gear, at maximum power at rated speed													
1H	28.1	9.9	10.21	2244	6.5	326	2.56	56	79	100	25	46	100.9
3.3.2.1.1 75% of pull at maximum power at rated speed													
1H	22.1	7.4	10.82	2337	4.7	343	2.44	55	79	102	25	45	100.8
3.3.2.1.2 50% of pull at maximum power at rated speed													
1H	15.4	5.0	11.14	2371	3.4	404	2.07	54	79	102	25	46	100.8
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.1													
2H	22.2	7.4	10.83	1593	4.6	285	2.94	53	79	97	25	42	100.9
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.2													
2H	15.5	5.0	11.17	1620	3.3	305	2.74	54	78	95	25	44	100.8
3.3.2.2 In selected gear nearest to 7.5 km/h, at maximum power at rated speed													
3L	27.7	15.2	6.54	2245	11.0	335	2.50	55	81	95	25	44	100.9
3.3.2.2.1 75% of pull at maximum power at rated speed													
3L	22.4	11.4	7.06	2339	7.7	340	2.46	55	80	98	25	45	100.9
3.3.2.2.2 50% of pull at maximum power at rated speed													
3L	15.5	7.6	7.38	2373	4.8	398	2.10	54	78	99	25	45	100.9
3.3.2.2.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.1													
4L	22.4	11.4	7.07	1906	7.5	303	2.76	56	80	99	26	40	100.9
3.3.2.2.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.2.2													
4L	15.6	7.6	7.41	1940	4.7	335	2.50	55	78	98	26	42	100.9

SUPPLEMENTARY TESTS

3 .3 Drawbar power test (unballasted tractor), 2 wheel drive

Date and Location of tests: 7 July 1999
Silsoe Research Institute
Wrest Park
Silsoe
Bedford MK45 4HS

Type of track: Concrete

Height of drawbar above ground	Tyre inflation pressure (kPa)	
	Front	Rear
465 mm	83	76

Gear and Range	Power	Drawbar Pull	Speed	Engine Speed	Slip of wheels or track	Spec Fuel cons	Spec energy	Temperature			Atmospheric conditions		
								Fuel	Coolant	Eng oil	Temp	Rel Humidity	Pressure
	kW	kN	km/h	rev/min	%	g/kwh	kWh/l	Deg C	Deg C	Deg C	Deg C	%	kPa
3.3.1 MAXIMUM POWER IN TESTED GEARS													
1L	8.4	12.6	2.40	2402	15.0	528	1.59	50	78	103	24	46	101.7
2L	12.5	12.8	3.50	2386	15.0	440	1.90	51	78	102	26	42	101.7
3L*	22.0	12.7	6.26	2333	15.0	358	2.34	50	78	101	26	43	101.7
4L	26.4	12.7	7.48	2281	15.0	345	2.42	52	80	103	24	43	101.7
1H	28.1	10.8	9.35	2244	11.9	330	2.54	51	79	100	24	51	101.7
2H	28.6	7.1	14.46	2253	7.3	324	2.58	53	80	101	23	51	101.7
3.3.2 FUEL CONSUMPTION 3.3.2.1 In selected gear, at maximum power at rated speed													
1H	28.1	10.8	9.35	2244	11.9	330	2.54	51	79	100	24	51	101.7
3.3.2.1.1 75% of pull at maximum power at rated speed													
1H	22.6	8.1	10.11	2338	8.4	337	2.49	54	80	101	23	50	101.7
3.3.2.1.2 50% of pull at maximum power at rated speed													
1H	15.7	5.4	10.57	2376	5.8	392	2.14	53	78	102	24	50	101.7
3.3.2.1.3 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.1													
2H	22.7	8.1	10.08	1593	8.6	285	2.94	55	81	101	25	42	101.7
3.3.2.1.4 Next higher gear at reduced engine speed; same pull and travelling speed as in 3.2.1.2													
2H	15.7	5.4	10.55	1615	5.7	293	2.85	56	78	99	25	43	101.7

* Gear nearest 7.5 km/h is a slip gear

* Shut downs were not possible in 3H due to limits of test equipment and track

4. OPTIONAL TESTS RESULTS

Location of centre of gravity

Height above ground, mm	731
Distance forward from the vertical plane containing the axis of the rear wheels, mm	761
Distance from the median plane of the tractor, mm (to left viewed from rear)	10

5. REPAIRS AND ADJUSTMENTS DURING TESTS: None

6. REMARKS: None

Test carried out by: S J Devonshire

Signed: Officer in charge of tests

J P Evans

Signed: for the Director

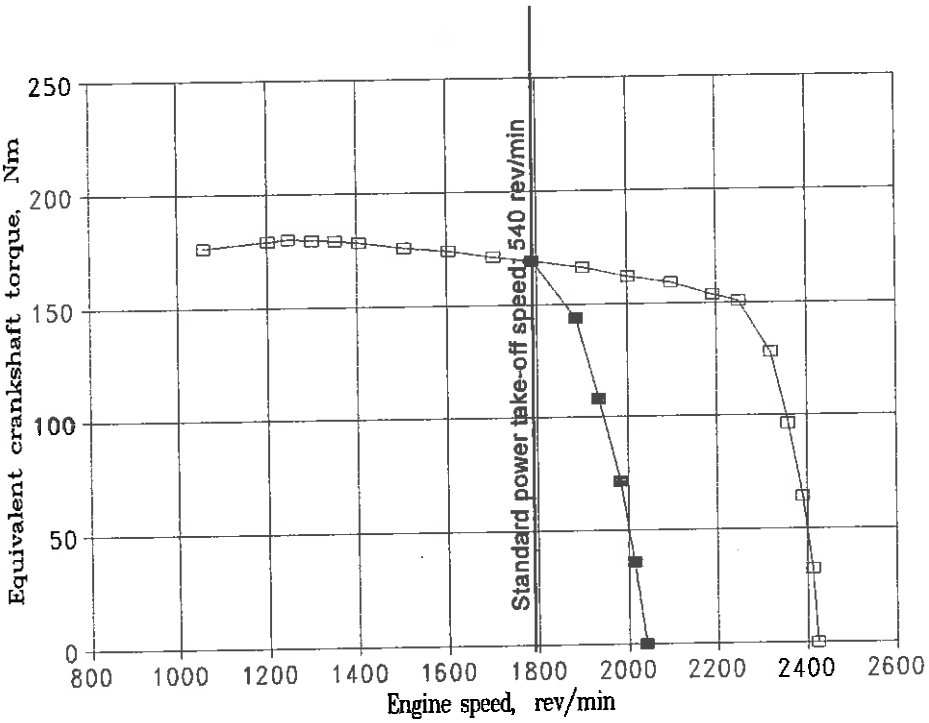
A G Douglass
Interim Manager, Test Engineering Group

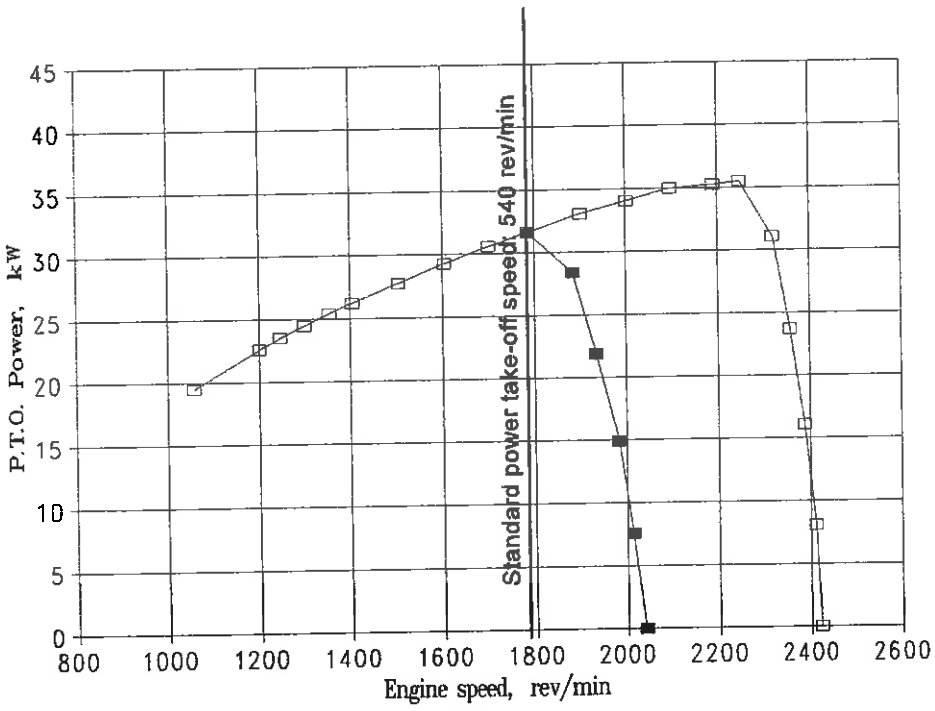
Date: 10/8/99

7. ANNEX 1 MAIN POWER TAKE-OFF CURVES

P.T.O. POWER TEST - MASSEY FERGUSON 243 FOUR-WHEEL DRIVE (540 rev/min)

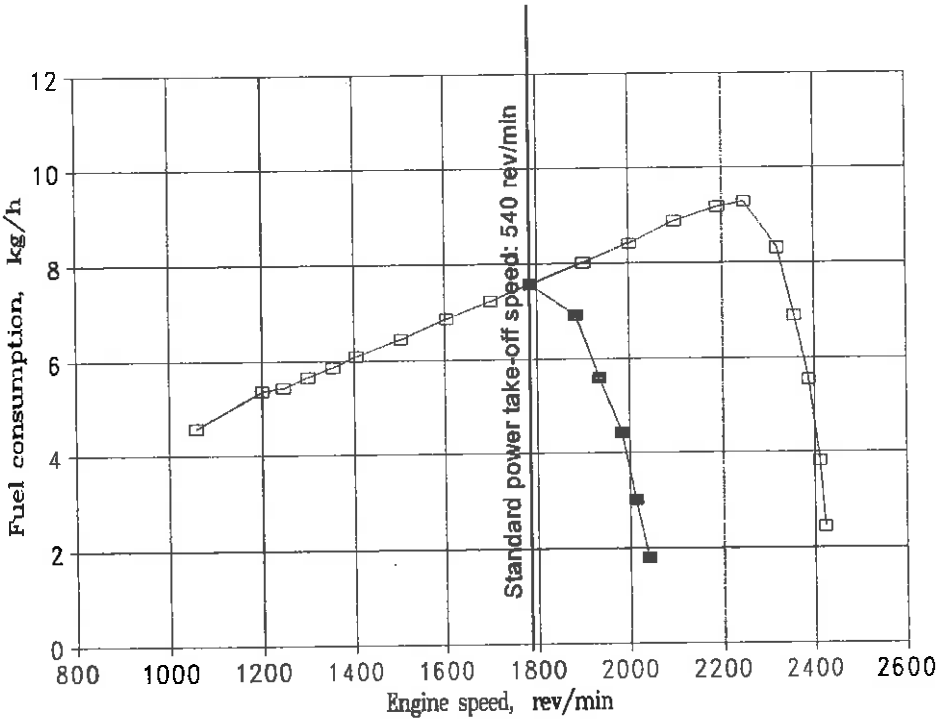
Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

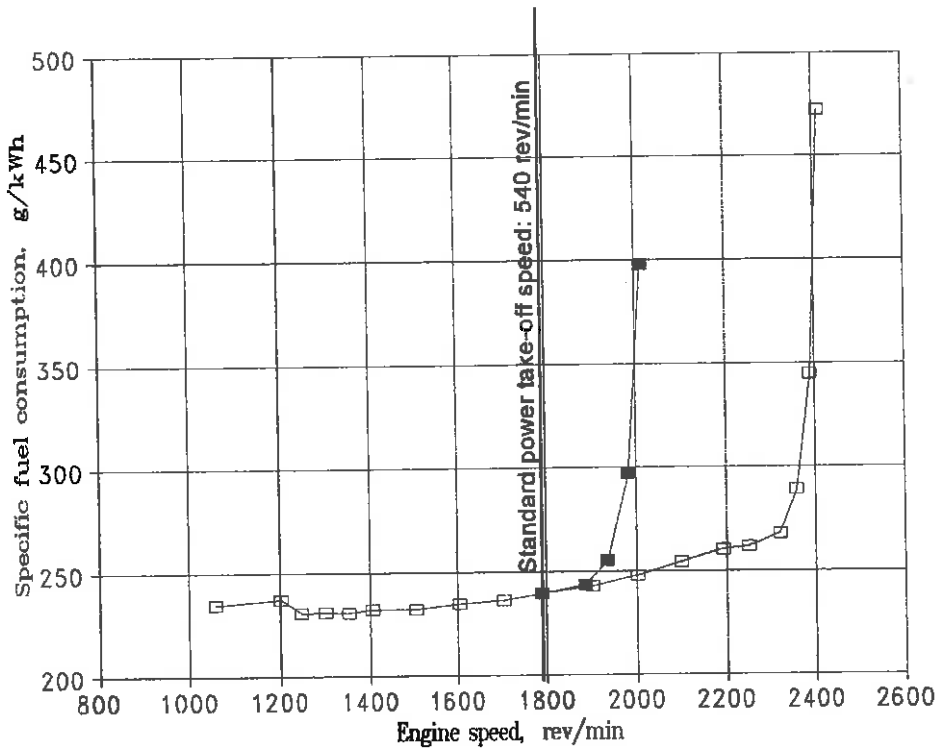




P.T.O. POWER TEST - MASSEY FERGUSON 243 FOUR-WHEEL DRIVE (540 rev/min)

Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■





P.T.O. POWER TEST - MASSEY FERGUSON 243 FOUR-WHEEL DRIVE (540 rev/min)

Governor set for maximum power at rated speed □
Governor set for maximum power at pto speed ■

